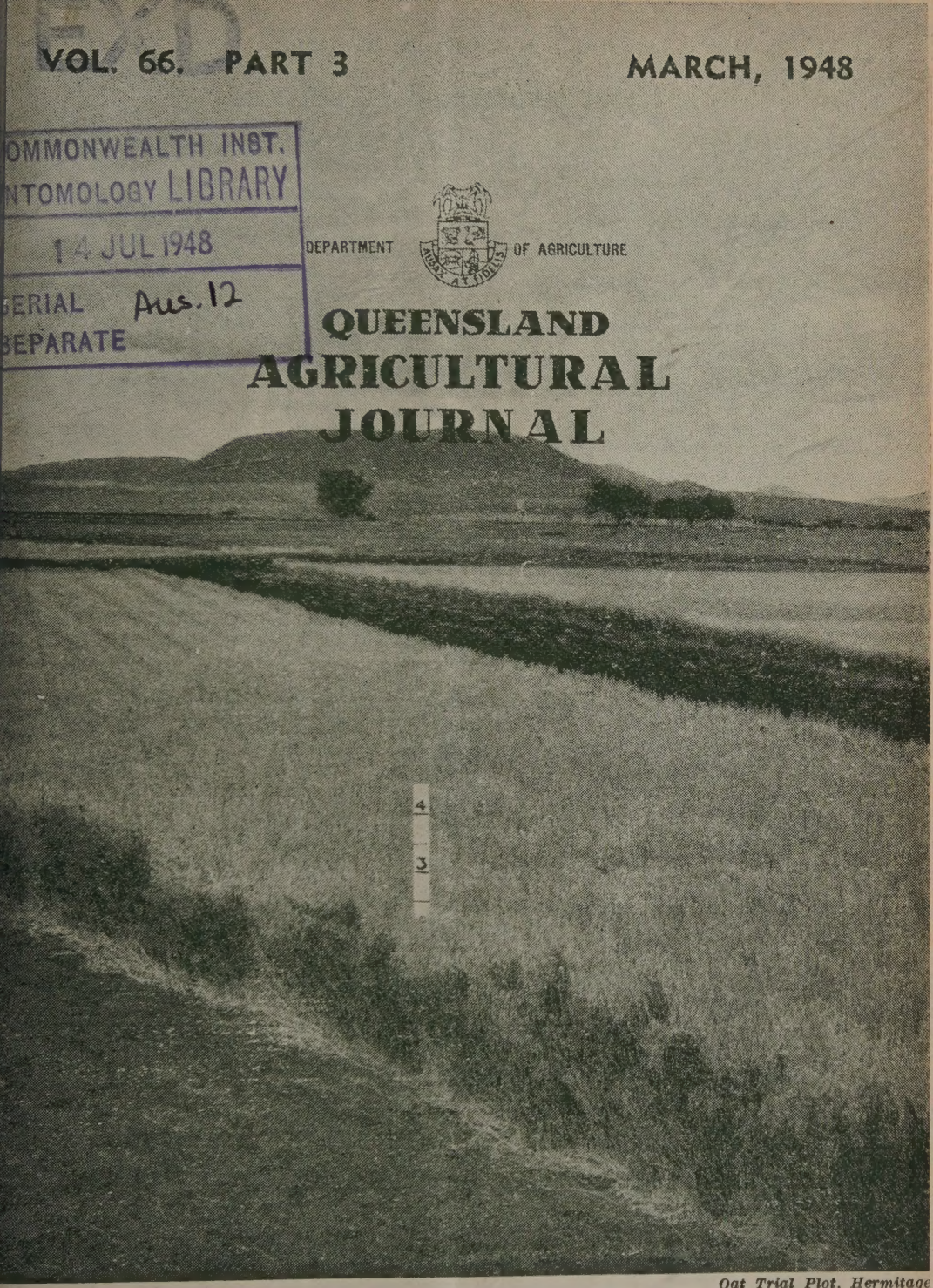
VOL. 66. PART 3 MARCH, 1948

COMMONWEALTH INST. OF ENTOMOLOGY LIBRARY
14 JUL 1948
SERIAL Aus. 12
SEPARATE

DEPARTMENT OF AGRICULTURE

QUEENSLAND AGRICULTURAL JOURNAL



Oat Trial Plot, Hermitage near Warwick, Q.

LEADING FEATURES

Linseed Growing.

The Channel Country of South-western Queensland.

Frost Damage in Lady Finger Bananas.

Summer Lettuce Varieties in Toowoomba District.

Water Blister Disease of Pinapples.

The Itch Mite of Sheep.

" Cheesy Gland " of Sheep.

Pink Eye or Blight of Sheep.

Registered at the General Post Office, Brisbane, for transmission by Post as a Newspaper.

ADVISORY AND TECHNICAL SERVICES

UNDER SECRETARY	A. F. Bell, M.Sc., D.I.C., A.A.C.I.
Assistant Under Secretary (Technical)	R. Veitch, B.Sc.Agr., B.Sc.For., F.R.E.S.
Assistant Under Secretary (Administration)	W. T. Gettons, A.I.C.A.
Special Administration Officer	H. Barnes
Accountant	E. C. R. Sadler, A.A.U.Q.
DIVISION OF PLANT INDUSTRY—	
Director, Division of Plant Industry	W. A. T. Summerville, D.Sc.
Director, Regional Experiment Stations	W. G. Wells
Agriculture Branch—	
Director of Agriculture	C. J. McKeon, Q.D.A.
Asst. Director of Agriculture	D. O. Atherton, Q.D.A., M.Sc.Agr.
Senior Plant Breeder	L. G. Miles, B.Sc.Agr., Ph.D.
Senior Agronomist	W. J. S. Sloan, M.Sc.Agr.
Senior Soils Technologist	W. J. Cartmill, B.Sc., A.A.C.I.
Chief Adviser	W. H. Bechtel
Chemical Laboratory—	
Agricultural Chemist	M. White, M.Sc., Ph.D., A.A.C.I.
O/C Plant Nutrition Section	C. R. von Stieglitz, F.A.C.I.
Horticulture Branch—	
Director of Horticulture	S. A. Trout, M.Sc., Ph.D.
Assistant Director	N. E. H. Caldwell, M.Sc.Agr.
Science Branch—	
Officer in Charge and Senior Pathologist	J. H. Simmonds, M.B.E., M.Sc.
Senior Entomologist	J. H. Smith, N.D.A., M.Sc.
Government Botanist	C. T. White, M.Sc.
Sugar Experiment Stations—	
Assistant Director	N. J. King
O/C Entomology and Pathology	R. W. Mungomery
Senior Soils Technologist	L. G. Vallance, M.Sc.
Senior Plant Breeder	J. H. Buzacott, M.Sc.
Senior Mill Technologist	J. L. Clayton, M.Sc.App.
DIVISION OF ANIMAL INDUSTRY—	
Director, Division of Animal Industry	W. Webster, B.V.Sc.
Chief Inspector of Stock	J. C. J. Maunder, B.V.Sc.
Director of Research	J. Legg, B.Sc., D.V.Sc., M.R.C.V.S.
Officer in Charge, Sheep and Wool Branch	G. R. Moule, B.V.Sc.
Officer in Charge, Cattle Husbandry Branch	R. D. Chester, B.V.Sc.
Officer in Charge, Pig Branch	F. Bostock
Officer in Charge, Poultry Branch	P. Rumball, R.D.A.
Divisional Veterinary Officers—	
Brisbane	A. F. S. Ohman, M.V.Sc.
Toowoomba	A. L. Clay, B.V.Sc.
Kingaroy	C. R. Mulhearn, B.V.Sc.
Rockhampton	A. R. Nott, B.V.Sc.
DIVISION OF DAIRYING—	
Director of Dairying	E. B. Rice, Dip.Ind.Chem.
Asst. Director and Senior Dairy Technologist	L. E. Nichols, B.Sc.Agr.
MARKETING DIVISION—	
Director of Marketing	H. S. Hunter
Assistant Director of Marketing	C. H. P. Defries, H.D.A., B.Com., A.F.I.A.
Standards Officer	F. B. Coleman
PUBLICATIONS—	
Editor	J. F. F. Reid
Associate Editor	C. W. Winders, B.Sc.Agr.
Photographer	W. J. Sanderson

N.Z. Novelty Freezia Burtonii

N.Z. NOVELTY—FREEZIA BURTONII.—Beautiful long-stemmed Freezia, delightful perfume, does not seed. Pure white. Top size bulbs, 2/- dozen.

ESCHALLOTS.—Good stocks on hand, 7d. ½ lb.; 2/- lb.

COUCH GRASS SEED.—Fresh stocks on hand, 5/6 lb. Procure your seed while it lasts.

RHUBARB CROWNS.—9d. each, 7/6 dozen; 1/- each, 10/- dozen. (Freight extra.)

BULBS.—Now is the time to think about planting bulbs. We have special collections, 5/-, 10/-, 20/- (Post free.)

THOS. PERROTT & SONS

337 GEORGE STREET :: 272 QUEEN STREET
88 BOWEN BRIDGE ROAD BRISBANE

Volume 66 Part 3

QUEENSLAND AGRICULTURAL JOURNAL

Edited by
J. F. F. REID
Associate Editor
C. W. WINDERS, B.Sc.Agr.

MARCH, 1948

Issued by Direction of
THE HONOURABLE H. H. COLLINS
MINISTER FOR AGRICULTURE AND STOCK

GOVERNMENT PRINTER, BRISBANE

Contents

	PAGE.
Event and Comment—	
Extension of Veterinary Services	131
Vaccination Against Brucellosis	132
Unit Herd Testing	132
Field Crops—	
Linseed Growing	133
The Channel Country of South-Western Queensland	138
Velvet Beans for Green Manuring	148
The Introduction of Badila Cane into Queensland	150
Fruit Culture—	
Prevention of Frost Damage in Lady Finger Bananas	155
Vegetable Production—	
Summer Lettuce Varieties in the Toowoomba District	158
Plant Protection—	
Water Blister Disease of Pineapples	160
Sheep and Wool—	
The Itch Mite of Sheep	161
"Cheesy Gland" or Caseous Lymphadenitis of Sheep	165
Pink Eye or Blight of Sheep	167
The Dairy Industry—	
Effect of Month of Calving on Production	169
10,000 Milk Smears	173
Pure Bred Production Recording, 1946-47	174
Production Recording	176
Beekeeping—	
New Beekeeping Legislation—*"The Apiaries Act of* 1947"	178
Marketing—	
The Butter Marketing Board	183
The Cheese Marketing Board	183
Egg Marketing Board	183
World Output of Potatoes	183
General Notes—	
Oat Crop Pool	184
Farmers Protected	184
Veterinary Science Scholarships	184
Rural Topics—	
Soil Fertility on the Dairy Farm	185
Use Penetrating Oil	185
Feeding the Dry Cow	185
Gadgets and Wrinkles—	
"Penetration" Method of Laying Cement	186
Don'ts for Pig Producers	186
The Farm Home—	
The Growing Child and His Food	187
The Farm Kitchen	188
Queensland Weather in February	189
Astronomical Data for April	190
Rainfall in the Agricultural Districts	192
Climatological Data for February	192

THE BRAND DENOTES THE QUALITY

MEALS S.P.A. PRODUCE

AGRICULTURAL SEEDS

SEED OATS

CLEANED, CLIPPED, GRADED

Best Imported:—Algerians, Belars, Fulghums, Mulgas.

Also Queensland Kurrajongs.

Bookings now being accepted for Australia's best seed Oats—delivery when required.

PEAS—GREEN FEAST, N.Z. 37/6 bushel.

Milo Meal, 150 lb. bag	17/3	Paspalum	1/10 lb.
Stock Meal, 150 lb. bag	19/6	Sudan	5d. lb.
Laying Mash, 120 lb. bag	16/6	Rhodes	1/1 lb.
		Saccaline	3d. lb.
		Japanese Millet	3½d. lb.

State Produce Agency Pty. Ltd.

266-274 ROMA STREET, BRISBANE

ANNUAL RATES OF SUBSCRIPTION.—Farmers, Graziers, and all other persons in Queensland and Northern Territory whose main source of income is from the land; also Schools, Schools of Arts, Agricultural Societies and Students in Queensland, **One Shilling.** All others, **Ten Shillings.**

QUEENSLAND AGRICULTURAL JOURNAL

Volume 66 | 1 MARCH, 1948 | Part 3

Event and Comment.

Extension of Veterinary Services.

ADDITIONAL veterinary services to Queensland stockowners are provided for in the *Diseases in Stock Acts Amendment Bill* introduced by the Minister for Agriculture and Stock, Hon. H. H. Collins, and now before the State Parliament.

In the course of his speech on the initiation of the measure in committee, the Minister said that its principal objectives were to increase facilities for testing dairy stock for tuberculosis and to make veterinary services more readily available. Fewness of qualified veterinarians for recruitment to his Department had retarded its tuberculosis testing programme. Many qualified men preferred private practice and it was proposed to offer an inducement to them to engage in this work and so accelerate the testing of dairy herds. It was intended to allot certain districts to private practitioners, giving them the sole right of testing for tuberculosis in dairy herds in those districts which are supplying milk to the metropolitan area. The veterinarians would contract with the Government to test all the dairy cattle in their respective districts at a prescribed fee of so much a head. The scheme would allow Government veterinary officers to give a better service to the stockowners of the State generally, in that so many of them would not be tied up testing for tuberculosis in dairy cattle. The areas in which the veterinarians engaged in private practice would operate would be defined in their respective contracts, but it would not necessarily follow that their private practice would be confined to those districts. The purpose was to define certain areas of operation for each, so that with their private

practice they would be assured of a reasonable living and thus become permanent residents as veterinarians in those areas.

Continuing, Mr. Collins said that for some time the Government had been concerned with the comparatively small number of veterinary surgeons in the State, to such an extent that enquiries had been made in other countries with a view to bringing qualified men from Great Britain, Europe or America. A conference had been held in Melbourne recently, consequent on discussions at the last meeting of the Australian Agricultural Council in Canberra, for the purpose of considering the desirability of inducing veterinary surgeons from other countries to set up practice in Australia. As a result of investigation it was found that some universities in the United States had qualifying examinations in veterinary science of a standard equal to that of the University of Sydney, the only institution in Australasia which provided for a full degree course. The University of Sydney was investigating what universities of other countries had equivalent veterinary school standards, and whether there was any reasonable system under which veterinary surgeons could come from other countries to set up practice here. Precautions would naturally be taken to protect those already engaged in the profession here and to protect the stockowner as well from the risk of services from men not fully qualified in veterinary science.

Concluding, the Minister said that he looked forward to the time when all the dairy herds of the State could be certified as free not only from tuberculosis, but from any other form of animal disease communicable to man. The Bill would help in the attainment of that laudable objective.

Vaccination Against Brucellosis.

LAST year more than 8,000 calves were vaccinated with Strain 19 as a protective measure against brucellosis (contagious abortion) and the first of the treated animals are now calving normally, as stated in a recent announcement by the Department of Agriculture and Stock. Heifers unmated under the age of 12 months may be vaccinated by veterinary practitioners or by veterinary officers of the Department. To facilitate vaccinations and to ensure economy farmers are advised to organize groups within their districts so that a maximum number of young stock may be treated with a minimum of travelling. It is preferable to arrange for the animals to be brought to a central place for treatment; if this is not practicable a definite itinerary for visits from farm to farm should be prepared. Arrangements along these lines have been made satisfactorily in the Beaudesert, Conondale, Maleny and Atherton districts. Branches of the Queensland Dairymen's Organization should contact local veterinary officers or inspectors of stock to arrange for this vaccination service.

Unit Herd Testing.

IN a recent Press statement Mr. Collins commended the interest and enthusiasm displayed by the dairy farmers of Maleny in the herd testing unit which commenced operations in that district early in February. The formation of a second unit is now contemplated. A departmental herd tester is visiting farms regularly for the purpose of weighing, sampling and testing the milk of individual cows in the respective herds. There are 25 farmers in the unit already established with an aggregate of 1,000 cows and the first round of testing is proceeding according to plan.

Linseed Growing.

C. S. CLYDESDALE, Senior Adviser in Agriculture, and S. G. BURNS, Assistant Agronomist.

FLAX fibre and linseed are two products of the flax* plant, of which there are two distinct types, one producing high yields of fine-quality fibre and the other high yields of flaxseed—the linseed of commerce. Both of these types are grown in Australia at the present time and, while most development has occurred in the southern States, trial plots indicate that the linseed type at least can be grown in Queensland.

From the grower's point of view linseed must be regarded as a cash crop, as the seed is not consumed on the farm where it is produced. The grower must, therefore, decide whether the returns from linseed justify the use of land for this crop, or whether the land would be more satisfactorily employed growing something else—wheat, for example. The decision depends, of course, on the prevailing price of linseed, the expected yield, the price of wheat and the grower's own summing up of all the facts concerned.

Linseed may be used in the normal crop rotation and the husbandry of the crop differs but little from that of wheat. The machinery used for cultivating, sowing and harvesting wheat may be used with slight modification for producing a crop of linseed. Thus, the prospective grower with experience of wheat production, if he has wheat machinery available, may turn his hand with some measure of confidence to the growing of linseed.

General Climatic Requirements.

The mild and humid areas of the world have been found most satisfactory for this crop. However, United States experience has been that satisfactory yields of good quality linseed are possible in the hotter regions with even a poor rainfall distribution, provided care is taken in the selection of the variety and in the methods used for preparing the seed-bed. Trials in southern Queensland to date indicate that the same may apply here. The rainfall during the growing season (May to November on the Darling Downs) is of great value to the crop, but in this type of climate it is the conserved moisture that is of first importance.

---

* *Linum usitatissimum.*

Soils.

The soil requirements of linseed are not as exacting as the climatic requirements. Practically any agricultural soil that shows no tendency to water-logging and is not sheltered or in a hollow is suitable for linseed production. Sheltered and low areas are unsuitable because their higher atmospheric humidity encourages rust development. Perhaps the best soil types are well-drained dark or chocolate loams, rich in organic matter.

Preparation of the Seed-bed.

Linseed is best grown on land that has been previously worked for another crop. Freshly broken land may be used, but the subsequent crop is as a rule a very poor one. However, no matter what the initial condition of the land, it must be given a long fallow if the linseed crop is to be worth while. The fallow period promotes the increase of sub-surface moisture and provides opportunities for the destruction of weed growth by cultivation.

A few words might be said to emphasize the effects of weeds and weed growth on the linseed crop. Linseed has a shallow root system and does not produce a great abundance of stem and leaf. Thus it is at a disadvantage when it comes into competition wtih vigorous weeds for available soil moisture and growing space. Such competition may result in crop failure and, even if a crop is produced, heavy weed growth makes harvesting difficult and reduces the value of the crop.

Thorough and correct preparation of the seed-bed will go a long way towards eliminating the weed menace, but the importance of the long fallow period, early seed-bed preparation and early sowing must not be overlooked. The farmer who has recognized and employed all the practices outlined herein can be certain that he has done all in his power to ensure success.

The general methods and implements for seed-bed preparation as used for wheat or oats are considered satisfactory for linseed. The fallow may be started at the same time as for wheat and the depth of ploughing and subsequent cultivations are essentially the same for both crops. It must be understood, however, that linseed requires a shallower seed-bed than wheat or oats and for this reason cultivations for the final preparation of the seed-bed should be shallower than those for the cereals. By adopting these methods the necessary firm, fine, moist, weed-free seed-bed will be assured.

Varieties.

The linseed plant is susceptible to many plant diseases, including wilt and rust. In choosing a variety, therefore, it is essential that, where possible, a disease-resistant one be selected. Of course, the other factors of high grain yield, high oil content and suitability for the climate should not be neglected. There is a little local experience available on the matter of varieties. Trials have been conducted here for several years and the information obtained from these, together with some facts from New South Wales, are outlined in Table 1.

TABLE 1.

Variety.	Queensland Notes.	N.S.W. Notes.
Ameliore ..	Height 2 ft.; mid-season; seed capsules small but plentiful; mature heads bent over, probably due to weather effects. No rust recorded	Some rust susceptibility
Abyssinian ..	Height 1 ft. 6 in.; early to mid-season; capsules small and plentiful. Rust recorded in one plot only	Some rust susceptibility
Bolley Golden ..	Height 2 ft. 4 in.; mid-season; capsules medium, plentiful; yellow seed; heads upright. No rust recorded	Rust-susceptible and a poor yielder
Ghahreh ..	Height 2 ft. 6 in.; late season; capsules medium to small and fairly plentiful. Rust attacks recorded	Rust-susceptible
Malabrigo ..	Height 2 ft. 9 in.; late maturing; capsules variable in size but plentiful. No rust recorded	Rust-resistant
Morocco ..	Height 2 ft. 4 in.; mid-season; fairly large capsules. No rust recorded	Rust-susceptible
Rio	Height 3 ft.; late or mid-season; capsules medium and fairly well filled. No rust recorded	Rust-resistant
Walsh	Height 2 ft. 9 in.; medium-early; capsules large and plentiful. No rust recorded	Rust-resistant

During the 1947 season a number of farmers on the Darling Downs grew small areas of the variety Walsh. This variety did well on black soils in a number of districts, and yields varying from 6 to 8 bags of graded seed per acre were obtained. This seed had an oil content varying from 40·5 per cent. to 37·43 per cent., which can be regarded as satisfactory.

Rate and Time of Sowing.

The rate of sowing and the time of sowing both affect the yield of linseed. Table 2, taken from a bulletin issued by the Department of Agriculture of South Australia, illustrates this point.

TABLE 2.

YIELD OF LINSEED IN BUSHELS PER ACRE, 1940.

Seed Rate. Lb. per Acre.	Time of Sowing.			Means of all Sowings.
	8th May.	22nd May.	5th June.	
40	10·43	7·63	7·03	8·36
60	10·02	6·70	6·69	7·80
80	9·08	6·89	6·74	7·57
Mean of all seed rates	9·84	7·07	6·82	..

Considering these South Australian results and also the recommendations made in New South Wales, it is evident that for maximum seed production a light sowing rate is essential. From observations made in Queensland in 1947 it seems evident that a sowing rate of from 20 to 30 lb. per acre is satisfactory for this crop on the Darling Downs.

Sowing should be early because it is desirable to have the crop ripe and fit to harvest before the November storm rains occur. A wet period at harvest time makes the crop difficult to handle because of the increased toughness of the stem, the prolonged flowering and the induced secondary growth. Mid-April to mid-May, then, seems to be the most satisfactory sowing period for this State, provided sufficient rain falls during this period to establish the crop.

Methods of Sowing and Depth of Sowing.

The crop may be sown satisfactorily with the ordinary wheat drill or the combine, both of which are readily adjusted to sow at the desired rate. One or two trial runs before sowing should be sufficient to indicate the correct adjustment. All the seed tubes of the machine are used so that the crop will be sown in rows 7 inches apart.

The following gear setting was used to establish a trial plot in 1947 on the Darling Downs. Using a Sunshine combine, the slowest drive gear was engaged with the 16-tooth cog and the seed was put through the wheat side of the combine without the use of reducers. This arrangement gave a sowing of 30 lb. to the acre and an excellent stand was established.

Seed drills, whether new or old, can spill a lot of seed from holes and crevices in the machine, and the slippery linseed is prone to find such adventitious outlets. Care should be taken, therefore, to tighten up the seed-box sections and to block up any holes or crevices in the machine.

An even stand is essential for a good crop and, consequently, sowing at an even depth in a properly prepared seed-bed is a desirable practice. The best results have been obtained by drilling the seed in at a depth of 1 inch, and certainly it should be placed no deeper than 1½ inches. If sown any deeper than this germination will be uneven.

Harvesting.

The crop must be fully mature and dry before harvesting commences. With the crop in this condition there should be no difficulty in harvesting with the ordinary wheat header or auto header. Briefly, the best time to harvest the crop is when the stems have turned yellow and the majority of the bolls are brittle and ripe. Harvesting should not commence before the crop has had a good period of hot sunshine in the morning.

Linseed production can only be successful while the costs of production are kept low. Thus the greater the mechanization of the industry the better the chance of making it pay. The header, therefore, which can and does handle the crop efficiently, is the best and only implement to be considered for the harvest. Some adjustments are necessary, but these present no difficulty.

Experience in New South Wales shows that the oat riddle, set more nearly horizontal than usual and with the lips facing back, is the best to use. The fan speed or air inlet should be regulated to sort the material without blowing out the seed. A bar drum is preferable to a peg drum and the drum should be adjusted in both speed and clearance so that it just breaks the bolls completely without damaging the seed.

The harvesting machinery can spill a lot of seed through any outlet or crack in the woodwork, and so steps must be taken to seal all cracks and crevices through which seed might escape.

Diseases and Pests.*

The linseed plant is susceptible to flax rust, flax wilt and soil-borne seedling diseases. Initial treatment of the seed with organic mercury dusts may have a beneficial effect in controlling some of these diseases, but the use of disease-resistant varieties whenever they are available is the best method of combating wilt and rust. However, even when using the resistant varieties, it is advisable to refrain from growing linseed on the same area two years in succession.

Insect pests also attack the linseed crop. At present these are known to include cutworms, corn-ear worm, the Australian plague locust and the red-legged earth mite. The corn-ear worm, although present in crops during 1947 without doing a great deal of damage, may present the greatest hazard to the production of linseed on the Darling Downs. In New South Wales in the same year, the corn ear worm infestation was so serious that dusting with D.D.T. dust from the air was necessary. Although it did no serious damage to the Darling Downs crops in 1947, when it appears it is desirable to adopt the control measures outlined hereunder.

Dusting of linseed with D.D.T. will give good control at a cost of from 15s. to £3 per acre for materials, the cost depending on the rate of application of the dust and the number of times the crop is treated. Rate of application at each dusting would be from 20 to 30 lb. of a 2 per cent. D.D.T. dust per acre. Crops will require from 1 to 4 dustings, depending on the severity of attack, growth of the crop in late spring and length of time during which heavy flowering occurs. In areas where the weather continues dry throughout the spring and yields are expected to be low, a single dusting at the rate of 20 lb. of 2 per cent. D.D.T. dust is suggested. Where crop prospects are reasonably good and yields of 15 to 20 bushels per acre seem likely, two dustings would be worth while. The first dusting should be made within a week after flowering begins, the second being applied 7–10 days later. A third and even a fourth similarly-spaced treatment might be given if infestation continues severe after flowering.

The critical period for most areas is expected to be from late September to about mid-October. Infestation should be at its peak while flowering and setting of the young bolls are at a maximum.

Marketing.

The 1947 crop of linseed in Queensland was grown for seed purposes. Each grower was supplied with seed by Meggitt Ltd., of Sydney, and produced the crop under contract to this firm. All seed produced has been set aside for planting during the 1948 season.

Meggitt Ltd. again intend to supply seed to growers during 1948, but at a cost of £1 12s. 6d. per bushel (56 lb.) of graded seed and on condition that the grower signs a contract with the firm. A price of £40 per ton of 2,240 lb., or the current value of imported linseed of equal quality if it be greater than £40 per ton, will be paid to the grower. However, this price will be paid only for sound, fully-matured grain, and dockages will be made where impurities or admixtures are present in excess of 2½ per cent.

* Recommendations for control approved by the Science Branch of the Department.

The Channel Country of South-Western Queensland.

By ARTHUR F. BELL,* Under Secretary for Agriculture, and Deputy Chairman, Bureau of Investigation of Land and Water Resources.

THE so-called "channel" country of south-western Queensland is one of the least known, but one of the most interesting tracts of land in Australia. Indeed it is no exaggeration to say that this unique, and vast, natural irrigation system ranks among the world's most interesting natural features. The channel country is situated in the neighbourhood of the "three corners," where Queensland touches the Northern Territory, South Australia, and New South Wales; it was the scene of the tragic finale of the ill-fated Burke and Wills expedition in 1861.

Remote and difficult of access it has remained very largely an unknown land, with potentialities alternately painted in vivid and sombre colours by its infrequent visitors. Now, however, the Commonwealth Government has formulated plans to build a standard gauge strategic railway from New South Wales, through Western Queensland, to the Northern Territory. If implemented, these plans could obviously have a far-reaching influence on the future of the channel country. It was with these possibilities in mind that the Bureau of Investigation of Land and Water Resources recently carried out a comprehensive physical and economic survey of its resources.

The "Centre" in the Remote Past.

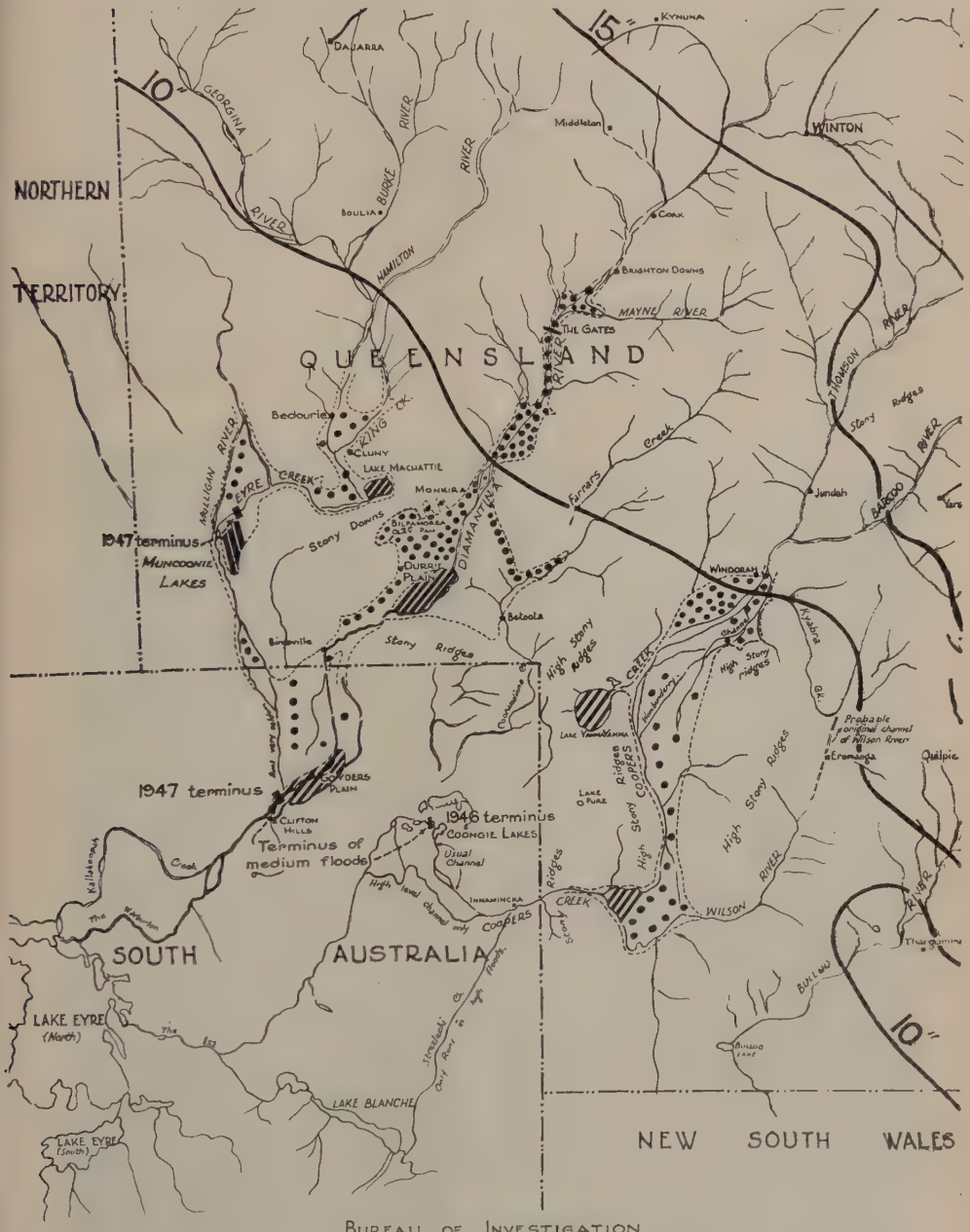
In the distant past the centre of Australia was very different from the arid picture it presents to-day. It was well-watered, and mighty streams flowed from high mountain ranges to discharge into the sea which extended northwards from the present Great Australian Bight. But, as the ages passed, the mountains were slowly worn down and the sea silted up, the rainfall declined, rivers ceased to flow, and the climate changed completely. To-day, only the ghosts of the once mighty rivers remain, and only occasionally do they flow into Lake Eyre, now a shallow, intensely salt lake, lying forty feet below sea level.

Of the streams which remain the most important are the Cooper, the Diamantina, and the Georgina. For most of their length these rivers flow through arid country, but their main tributaries rise in the comparatively well-watered zone south of the Gulf of Carpentaria. As a result of monsoonal rains in this upper part of their watersheds, they periodically flood.

The slow weathering of this ancient land has smoothed it out, and for a distance of some 500 miles above Lake Eyre the fall of the streams is only about one foot in a mile, or even less. With no permanent flow of water to maintain the stream bed, these periodic floodings have cut innumerable channels in the flat terrain. For a distance of about 200 miles upstream from the South Australian border there is no well defined single stream, but a complex network of criss-crossing shallow channels. Aerial photographs reveal these remarkable streams as resembling a gigantic and unevenly spread fishing net of variable sized mesh.

---

* In a National Country Hour broadcast from 4QR, Brisbane, 1 March, 1948, and published by courtesy of the Australian Broadcasting Commission.



BUREAU OF INVESTIGATION

CHANNEL COUNTRY

OUTER LIMITS OF HIGHEST FLOODS

BETTER QUALITY AREA

ISOHYETS 10"

40 0 40 80 100

SCALE OF MILES

Plate 40.

This is the "channel country" and in each river it varies in width from about 5 to 30 or 40 miles.

Where Flood Waters Flow.

Floods coming down from the upper reaches of the Cooper, Diamantina, and Georgina enter the channel country near Windorah, Diamantina Gates, and Bedourie respectively. There the flood waters spread out into the vast networks of channels and the crest of the flood passes slowly southwards towards Lake Eyre at the rate of perhaps 4 or 5 miles a day.

The area inundated naturally depends on the height and volume of any particular flood. On the Cooper the maximum inundation by a major flood is about 3½ million acres. The flooded area is not, of course, a solid block, but is interspersed with somewhat higher sections which are not submerged in any flood.

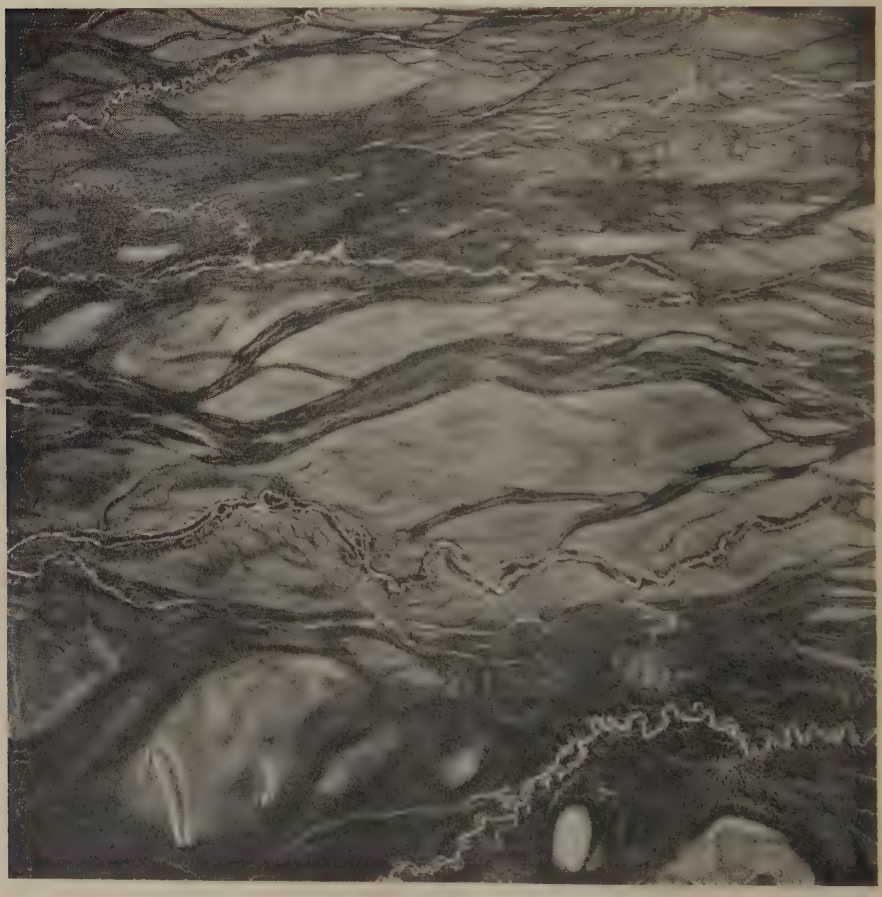


Plate 41.

THE COOPER BELOW WINDORAH.—Showing minor channels and swathes of swamp gutters twined between lenses of high-level silts (most of the lenses with ghost structures of vanished dunes). Active sand-dunes can be seen in the lower half of the photograph.

With the exception of the larger channels the period of inundation is but a matter of days, and as the flood passes southwards there springs up a vigorous growth of quick-maturing annual grasses, clover, and herbage; at this time the channel country is perhaps the best cattle-fattening country in the Commonwealth. The feed remains palatable and nutritious for several months after this single irrigation.

A Fattening Area.

The channel country serves primarily as a fattening area for store cattle which have travelled in from the breeding grounds of the Northern Territory and the Gulf. Once in the channels these cattle fatten to prime bullocks amazingly quickly, but unfortunately they have to be walked both into the fattening area, and out of it to market. The stock routes pass through unfavourable country and not only is condition lost on both inward and outward walks, but they must be held longer in the channels. Young baby beef cannot be marketed in its

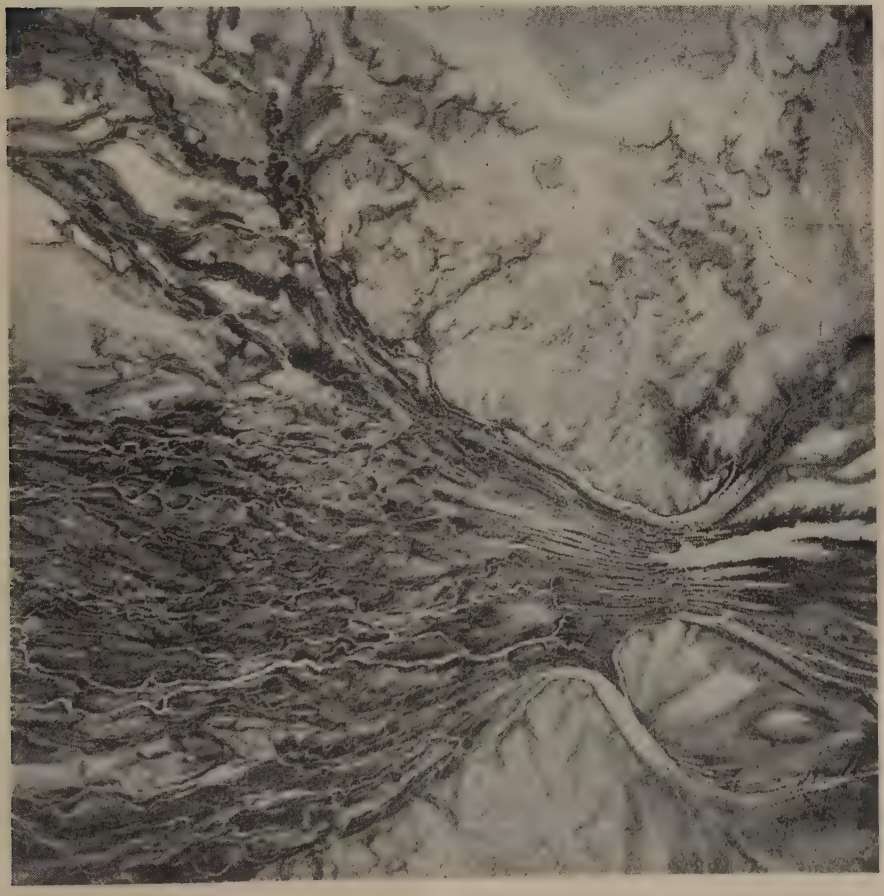


Plate 42.

Hunter's Gorge on the Diamantina at Diamantina Gates.—A bottleneck where the channel country is constricted between cliffed areas of laterite.

Plate 43.
COONGIE LAKE, SOUTH AUSTRALIA, TERMINUS OF COOPER FLOODS.

[*P. J. Skerman, photo.*

Plate 44.
NAPPAMERRIE HOLE IN FRONT OF THE HOMESTEAD, 42 feet deep.

[*C. Ogilvie, photo.*

Plate 45.
BREAKAWAY FROM EULBERTIE WATERHOLE WHICH FEEDS LAKE YAMMA YAMMA.

[*C. Ogilvie, photo.*

Plate 46.
CULYAMURRA WATERHOLE, NEAR THE SOUTH AUSTRALIAN BORDER.

[*C. Ogilvie, photo.*

Plate 47.

LOOKING DOWN EULBERTIE WATERHOLE.—Probably the biggest in Western Queensland, now 16 miles long and 35 feet deep.

[*C. Ogilvie, photo.*

Plate 48.

CURRAREVA WATERHOLE, WINDORAH.

[*C. Ogilvie, photo.*

Plate 49.
MUSTERED FOR MARKET.—Fat cattle on the Cooper.

[*D. Macfarlane, photo.*

Plate 50.
MOB OF TANBAR BULLOCKS ON THE ROAD TO THE RAILHEAD.

[*D. Macfarlane, photo.*

best condition, because cattle must be held until they can stand the long walk to the Queensland railheads or down into New South Wales or South Australia. About 40 per cent. of the fat cattle from this area are now marketed in Adelaide, and 30 per cent. in New South Wales.

It has often been suggested that these rivers be dammed so that the excess waters of big floods could be stored, and released in dry years to irrigate the channels. The investigations of the Bureau have shown, however, that this is not feasible: Firstly, big floods are not frequent and in most years the present natural system of irrigation channels uses the available water efficiently. Secondly, there are no suitable sites for the storage of large volumes of water; the flat nature of the land would mean broad shallow reservoirs from which, in that dry country, most of the water would evaporate before its use became profitable, and the quantity remaining would not justify the high construction and administrative costs. Moreover, the riparian rights of the cattle stations lower down the rivers, and the claims of South Australia to water, must have first consideration.

On the other hand, there is no doubt that a suitably placed railway would greatly increase the productive capacity and stability of the channel country. Store cattle could be railed in from the breeding grounds immediately the floods had passed, instead of being walked in; not only would they arrive in better condition but they could also arrive some five to ten weeks earlier. The fat cattle could later be railed out, saving both loss of condition on the road and permitting the marketing of younger bullocks. Furthermore, in years of no flood any stock held in the channels could be railed away to relief areas and losses greatly reduced.

Plate 51.

FAT BULLOCKS ON TANBAR, IN THE "CHANNEL" COUNTRY.

[*D. Macfarlane, photo.*

Fat Cattle from the Cooper.

Over the past 20 years the turn-off of fat cattle from the Cooper has averaged about 21,000 per year, but it has been estimated by the Bureau that with reasonable rail facilities this could be increased to an annual average of at least 80,000, with a maximum in a big flood year of about 200,000. If the productive capacity of the Diamantina and Georgina be taken as together equal to that of the Cooper, the total average turnoff could be in the vicinity of 160,000 a year, with a maximum of 400,000.

The addition of these numbers of prime fat cattle would be of great importance in the development of Australia's meat trade; furthermore, they would be marketed at a time of year when the numbers of fat cattle from other sources are declining. It is true that the productive capacity of the channel country does not of itself warrant the building of any great length of railway, but if (as seems inevitable) a strategic north-west railway is to be built, then, by suitable routeing, it can also be used to develop an important food production area which, incidentally, would also be strategically placed.

QUEENSLAND SHOW DATES, 1948.

Barcaldine	May 12–13	Innisfail	July 30–31
Beaudesert	May 6–8	Ipswich	May 11–13
Biggenden	May 20–21	Kalbar	May 29
Biloela Rodeo	May 21	Kilkivan	May 25–26
Biloela Show	May 19–20	Kingaroy	May 6–8
Boonah Campdraft	May 27 and 29	Laidley	June 25–26
Boonah Show	June 4–5	Lawnton	July 30–31
Bowen	June 30–July 1	Lowood	June 11–12, 14
Brisbane R.N.A.	August 7–14	Mackay	June 22–24
Bundaberg	June 3–5	Malanda	September 3–4
Cairns	July 20–22	Marburg	May 7–8
Charleville	Abandoned	Maryborough	May 27–29
Childers	May 31–June 1	Miles	May 19–20
Chinchilla	May 13–15	Murgon	May 20–22
Cooroy	August 28	Nambour	July 1–3
Crow's Nest	May 28–29	Oakey	March 17–18
Dirranbandi	May 28–29	Proserpine	June 25–26
Eidsvold	May 3–4	Rockhampton	June 16–19
Esk	May 14–15	Roma	May 5–6
Gatton	July 15–17	Rosewood	July 9–10
Gayndah	May 12–14	St. George	May 14–15
Gin Gin	June 7–8	Tara	May 7–8
Gladstone	June 10–12	Taroom	May 3–5
Goomeri	May 17–19	Thangool	May 14–15
Goondiwindi	May 1 and 3	Toogoolawah	June 18–19
Gympie	May 20–22	Townsville	July 6–8
Ingham	July 16–17	Warrill View	May 22
Inglewood	May 7–8	Wondai	May 13–15

Velvet Beans for Green Manuring.

By NORMAN J. KING.*

PRIOR to 1930 the principal green manure crops grown by cane farmers in the Bundaberg area were Mauritius bean, black cowpeas, and the clay-coloured giant cowpeas. The advent of Poona pea at about this period, with its reputation for vigorous growth and early maturity, was responsible for the almost complete disappearance of the Mauritius bean and black-seeded cowpea varieties. The clay-coloured giant cowpea has survived in the Isis area but is rarely seen growing on a large scale in the Bundaberg district.

The Mauritius bean (one of the velvet bean family) is characterised by excellent vigour, a long growing season, very heavy crop, and a dense mass of vine and leaf growth. It has a deeper and more extensive root system than the Poona pea and shows much less distress in dry periods. At the time when Poona pea came into favour the disadvantages claimed for the Mauritius bean were (*a*) difficulty in ploughing in the heavy vines and (*b*) the poorer early cover. At that time tractor ploughs and tandem disc harrows were not in common use as they are to-day, and a good Mauritius bean crop would probably be no obstacle to present day farm implements. The poor early cover of Mauritius bean was the result of the lighter seeding used with this large seeded species. Seed generally cost about £2 per bushel and was, in consequence, used sparingly. The most successful growers of this crop overcame this difficulty by planting in drills at the rate of 20 to 30 lb. per acre. This method economised on seed when compared with broadcast methods and allowed interspace scarifying on dirty land until runners met across the rows. With modern fast tractors and cultivators this job is done speedily and is amply repaid by the prevention of weed and grass seeding in the fallow.

In recent years growers in general are frankly critical of the Poona pea. Some go so far as to say that the characteristics of the crop have changed but all are agreed that its vigour and general performance are not what they used to be. Whether this is right or wrong is not the purpose of this article, but the impression is gained that a change in variety would be welcomed. Experience on the Bundaberg Station during the season of 1946-47 suggests that reversion to the growing of the velvet bean types may be the answer for the time being. The Director of Agriculture supplied to the Bureau small quantities of seed of six velvet bean varieties for field trial purposes. These varieties were Black Mauritius Q.1660, White Mauritius Q.1432, Marbilee Q.1744, Jubilack Q.1742, Smith Q.708, and Somerset Q.707. These were planted on the Bundaberg Station on 23rd September, 1946, in a block which had had a Poona pea crop the previous summer and had been bare fallowed since that time. The varieties were planted in drills 4 feet apart and each plot consisted of four rows 87 feet long. Four plots of each variety were planted. There was only fair soil moisture at planting time and germination did not take place until 99 points of rain fell on 27th October. At the same time volunteer Poona pea appeared on that portion of the block not planted with the trial, the seed being there from the previous crop. No further rain was recorded until mid-November when some three inches fell over a

* In the *Cane Growers' Quarterly Bulletin* (Bur. Sug. Expt. Stns., Dept. Agric. & Stk., Q.) for January, 1948.

period of a week. This gave a good burst of growth but December remained very dry and no useful rain fell again until an inch in mid-January. This two months without effective rain, in the middle of the hot weather, gave a severe check to the Poona pea. It ceased growing, wilted and began to flower as is its habit when checked. The velvet beans continued to make growth, threw out long vigorous runners and were not apparently distressed by the dry soil conditions. Growth continued normally with the good February and March rain and by late March flowers and young pods were noticed in all varieties, while the soil surface under the plants was covered with a thick litter of bean leaves.

Despite the lack of rain from mid-November to mid-January the beans had met across the interspaces and provided a good cover by early January. So vigorous was the growth that on three occasions the runners which were encroaching on the adjacent plots had to be cut and thrown back. In mid-April about 10 per cent. of each plot was cut off level with the ground and weighed so that the tonnage per acre of each plot could be obtained. The remainder was left for seed collection. The two bad germinators, Jubilack and Smith, were not weighed as their stand was so sparse, but seed was collected for further trial. The tonnages were as set out in Table I.

TABLE I.

Green Harvesting Weights of Velvet Beans.

Variety.	Tons per acre.				Average.
	Plot 1.	Plot 2.	Plot 3.	Plot 4.	
White Mauritius	13·6	10·9	7·5	14·8	11·7
Black Mauritius	13·9	13·9	15·6	16·3	14·9
Somerset	13·4	13·6	13·6	15·6	14·1
Marbilee	15·8	16·5	17·3	17·5	16·8

Analyses of the dried material were made and the results are set out in Table II.

TABLE II.

Analysis of Dried Velvet Bean Samples.

Laboratory Number.	A2690.	A2691.	A2692.	A2693.
Variety.	Black Mauritius Q1660.	Marbilee Q1774.	Somerset Q707.	White Mauritius Q1432.
	Per cent.	Per cent.	Per cent.	Per cent.
Total Organic Matter	87·71	88·01	88·98	88·34
Total Mineral Matter	8·12	8·34	7·97	7·84
Moisture	4·17	3·65	3·05	3·82
	100·00	100·00	100·00	100·00
Insoluble	0·40	0·36	0·42	0·44
Lime (CaO)	2·45	2·32	2·45	2·65
Magnesia (MgO)	1·05	0·97	0·89	0·84
Potash (K_2O)	0·42	0·43	0·41	0·36
Phosphate (P_2O_5)	0·41	0·38	0·45	0·43
Total Nitrogen	3·00	3·10	3·18	2·96
Protein (N x 6·25)	18·75	19·38	19·88	18·50

The nitrogen content of these crops is particularly good and, in the case of a 15 tons per acre yield, represents a gain to the soil of approximately 200 lb. per acre of nitrogen which is equivalent to 1,000 lb. of sulphate of ammonia. Even more important features of the velvet bean type of crop are the resistance to bean fly and wilt. The former is always likely to destroy Poona pea crops in any part of the sugar belt if conditions are favourable, while the latter causes severe losses in the wetter parts of the North. The drought resistance of velvet beans makes them a desirable type for all areas where soil moisture is likely to be a limiting factor in crop growth and the deep root system must have an ameliorating effect on subsoil conditions. Where land can be left under long fallow and not planted with cane until August or September the velvet beans are of particular value. The ground is covered from February onwards with a dense crop and the fallen leaves produce an excellent decomposing leaf mulch on the soil surface. It is this rotting surface material which assists in the development of a desirable soil texture, without which good planting tilth is unobtainable.

All seed from the six varieties of velvet beans mentioned above has been collected and will be replanted in spring 1948 under a range of conditions and soil types. As soon as the best is selected arrangements will be made to propagate seed stocks commercially so that the variety will be available to cane growers.

The Introduction of Badila Cane into Queensland.

By C. G. HUGHES.*

ALTHOUGH this article happens to appear at a time when the percentage tonnage of Badila is decreasing it is certainly not an *in memoriam* notice, for there is still a future ahead of this fine variety and it will be many years before it is displaced from its position as the leading cane of the State. It is common knowledge that Badila came originally from a native garden in New Guinea, being brought back by the expedition led by the late Mr. Henry Tryon, but, as far as the present writer is aware, details of the trip have never been published. They have been brought to light recently during an attempt to reduce the enormous piles of correspondence which had accumulated in the Department of Agriculture and Stock building, William Street, Brisbane, during the past fifty years or more. Most details of the expedition are there, together with the distribution and behaviour of the varieties when grown at Mackay and Kamerunga (near Cairns). Many of the letters are in the beautifully uniform handwriting of the copying clerks but a proportion are typewritten in a type not seen on modern machines, and others again are in the honest, laboured hand of men apparently more used to working than to writing. The idiosyncrasies of personalities and the oddities of Government administration are displayed in candid fashion but time has so smoothed them out that they are now seen to play only a small part in the story of the expedition.

* In the *Cane Growers' Quarterly Bulletin* (Bur. Sug. Expt. Stns., Dept. Agric. & Stk., Q.) for October, 1947.

The original intention of Mr. Peter McLean, then Under Secretary of the Department of Agriculture, was to use the cutter "Lizzie Jardine," which, under the command of Captain J. Griffiths, was employed on departmental work on the Central Queensland coast. However, the Captain's report on the condition of the vessel was so unfavourable that the idea was abandoned. Indeed it is remarkable that the "Lizzie Jardine" could be used for anything seeing that "her topsides above the copper were very bad, the wood around the bolts was quite rotten and her main-boom decayed." Arrangements were then made for a boat to be chartered from Burns Philp and Company and the cutter "P.C.E.," of nineteen tons, was obtained for a period of two months at £20 per month. It was to be handed over ready for sea in all particulars excepting wood and water, provisions and crew. Captain Griffiths was to proceed to Thursday Island with two men and take command of the cutter.

The Brisbane contingent left on s.s. "Warrego" on 26th August, 1895. It included Mr. Henry Tryon, Entomologist to the Department, John Liverseed, and Mr. R. Wilson. Mr. Tryon had been selected to lead the expedition because it was known that beetle and moth borers were present in New Guinea and an entomologist was properly considered to be more likely to obtain insect-free canes than one not so trained. John Liverseed, who later became manager of the Hermitage State Farm, was then storeman at the Department. He was put in charge of a supply of "trade" to be used for bartering with the natives. Items on his list included tobacco, matches, pipes, gilt chains (at two shillings per dozen), assorted beads (32 pounds at one shilling per pound), and some calico and twill. The medicine chest was under Mr. Tryon's direct personal control, apparently for the reason that it contained the only alcoholic liquor allowed on board. John Liverseed was also expected to assist in the collection of canes and their packing. Although it was not expressly stated that he should do so, he also used to carry Mr. Tryon ashore from the ship's boat so that Mr. Tryon would not get his feet wet or cut on the sharp coral. Mr. R. Wilson went as a passenger, but there is little mention of his activities on the expedition. He died only eight years ago, after rising to the post of Acting Under Secretary in the Department of Agriculture and Stock.

There was some dissension in the party after arrival at Thursday Island and Captain Griffiths, who had confessed to ignorance of Torres Strait and New Guinea waters, accepted the recommendation of the Government Resident, the Hon. John Douglas, C.M.G., to resign, and returned by mail steamer to Mackay. Captain Bebrouth was given command of the cutter and she sailed from Thursday Island on 14th September, 1895.

A call was made at Port Moresby in order to meet Sir William McGregor and present a letter of introduction from Mr. McLean. However the Administrator was away at the time and the expedition left the capital on 30th September without having seen him. The next few days were spent in calling at villages along the coast to the east of Port Moresby, but no canes were collected since all were suffering from the effects of the current drought. On 9th October, Mr. Tryon called on a Mr. Guise, who lived near Hula, and in consultation with that gentleman decided to organise a special trip to the Kemp Welch River. Seven days were spent up this river and, although little cane was

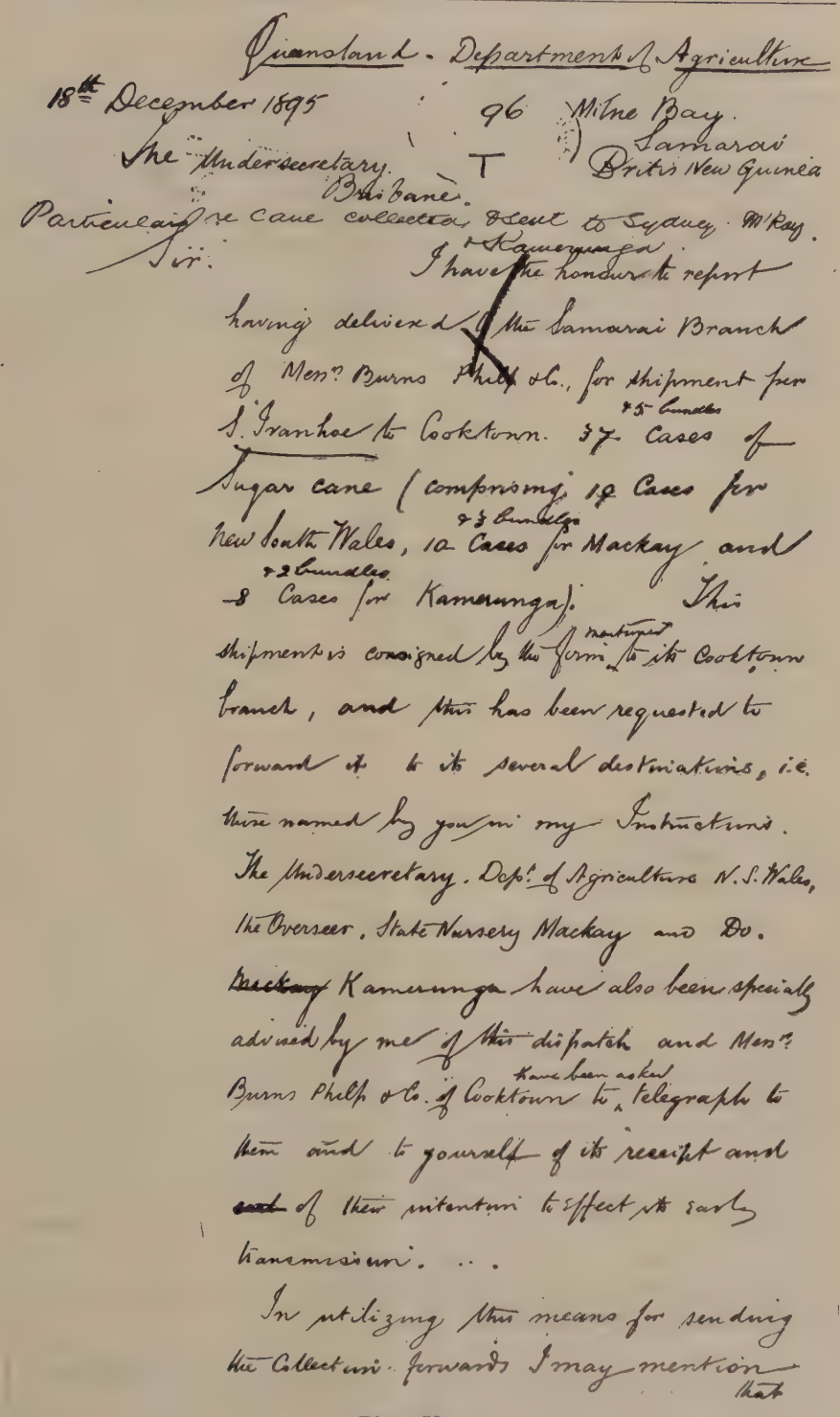
obtained, the trip was not without its excitements, as at one stage Mr. Tryon "was deterred from continuing his journey by reason of a threatened personal attack on the part of the inhabitants of a native village." A good deal of cane was seen but it was all either standover and riddled with boring insects or else far too young. The drought and near-famine conditions of the land were blamed for the lack of suitable canes and less than two cwt. were obtained. Varieties taken included some collected by E. Cowley in 1893, samples of which Mr. Tryon had brought with him in order to avoid undue duplication. This batch of cane never reached Queensland as it was later discarded owing to inability to ship it.

After leaving Kemp Welch River a severe storm was encountered and the Captain took shelter at Caution Bay, some thirty miles to the west of Port Moresby. Seas were still high when the voyage eastwards was resumed and the cutter put in at Port Moresby before going directly to Samarai on Dinner Island at the mouth of Milne Bay, where she arrived on 12th November. Mr. Tryon met Sir William McGregor at Samarai and after a long discussion Sir William proposed that Mr. Tryon should prolong his stay by about two months and, after discharging the "P.C.E.," attach himself to Sir William on the "Merrie England." This arrangement, however, was apparently not accepted. It was about this time that the Under Secretary began to get worried about the lack of canes and the mounting expenses, but several telegrams including one peremptory demand to return at once, did not reach "your obedient servant, Henry Tryon, Entomologist," until he had been back in Brisbane for some time.

It would appear that during the next month or so Mr. Tryon was too busy collecting canes to write any reports and the next letter from him, dated 14th December, 1895, at Milne Bay, mentions that the small amount of case timber still remaining would prevent much further sugar cane being obtained. Between 19th November and 12th December fifty apparently different varieties were secured from the country at the back of Bently Bay, and from between it and East Cape, and from that facing the entire seaboard of Milne Bay. "The obtainment has indeed been an arduous undertaking, involving on my part lengthy journeying on foot or in canoe, and my being on more than one occasion absent from the cutter for several days in succession." On 18th December, 1895, Mr. Tryon delivered to Messrs. Burns Philp and Company at Samarai 37 cases and five bundles of sugar cane collected in the Milne Bay area (see Fig. 38). A further collection was made in the Mullen's Harbour area and a number of bundles of cane brought from there.

Next news of the expedition was contained in a telegram from Cooktown announcing Mr. Tryon's arrival per "P.C.E." direct from Samarai. Apparently the Mullen's Harbour collection was aboard. The first consignment had come to Cooktown earlier on the schooner "Ellangowan" but had missed the weekly mail steamer and was still in store when the "P.C.E." arrived. With Mr. Tryon aboard and with both batches of cane the s.s. "Arawatta" sailed from Cooktown on 10th January leaving Mr. Wilson, John Liverseed, and a man named Hansen to pack surplus stores after paying off the cutter.

Meanwhile preparations had been made in Cairns to receive the batch for Kamerunga. A special train brought the two and a quarter tons from "Arawatta" to Redlynch Railway Station on the evening of Saturday, 11th January. On the following morning some of the cases



Queensland - Department of Agriculture

18th December 1895

96 Milne Bay. Samarai British New Guinea

The Undersecretary. T

Brisbane.

Particulars re cane collected & sent to Sydney. Mr Ray.

Sir.

I have the honour to report having delivered at the Samarai Branch of Messrs Burns Philp & Co., for shipment per S. Ironhoe to Cooktown. 37 Cases of Sugar cane (comprising 19 Cases per Kamerunga +5 Cundles New South Wales, 10 Cases for Mackay +3 Cundles and 8 Cases for Kamerunga +2 Cundles). This shipment is consigned by the firm's Samarai to its Cooktown branch, and they has been requested to forward it to its several destinations, i.e. those named by you in my Instructions. The Undersecretary, Dept. of Agriculture N.S. Wales, the Overseer, State Nursery Mackay and Do. Kamerunga have also been specially advised by me of this dispatch and Messrs Burns Philp & Co. of Cooktown have been asked to telegraph to them and to yourself of its receipt and of their intention to effect its early transmission. . . .

In utilizing this means for sending the Collection forwarded I may mention that

Plate 52.

A facsimile of the first page of Mr. H. Tryon's covering letter referring to the consignment of cane plants from New Guinea, which included Badila.

and bundles were hauled to the Nursery. The first cane taken out of the first case opened showed that live borers were present. The cane was repacked and taken back to Redlynch station while Mr. Cowley awaited instructions. These were to the effect that he was to go ahead and plant the cane, which he did, cutting the sticks into small setts and carefully examining each piece. It was noted that the cane was shooting in the packing and shoots were often two to three inches long. Mr. Cowley records that the borer was seen in every variety except one, with infestation varying from "borer present" to "alive with borer." Fifty-six different varieties totalling some 2,000 setts were unpacked with No. 15, later to become widely grown as "Badila," represented by 96 setts. It had borer present and was a dark-purple, short-jointed cane. The crop from this planting was prolific, the average number of sticks was 10 and the leaves were broad and handsome; it was classified as "class 2, well in front."

The consignment for Mackay included the only complete set of the Milne Bay batch, as well as canes from Mullen's Harbour. A total of about two tons of cane was received at Mackay. Mr. D. Buchanan, the Overseer of the Nursery, reported that there was no need to be afraid of the borer in that locality (it was already there) as there was very little left of the first lot of canes after he had been through them. The lot from Mullen's Harbour was in better condition. There were fifty varieties in the first consignment, *i.e.* from Milne Bay, and thirty in the second, including a number of duplicates, from which a total of sixty-six different canes was obtained. A report in the following year stated that one No. 15 was "not a promising cane," although the other No. 15, from Milne Bay, was "a great crop"; the difference was more an indication of soil variation as between the two plots than any difference between the two canes.

The three and a half tons of cane sent to New South Wales did not open in good condition and only 13 cwt. of germinable plants were obtained. However, the N.S.W. Government paid £71 19s. 4d. as its share of the expenses of the expedition and everybody appeared to be reasonably well satisfied.

A little over seven tons of cane had been collected by the expedition, comprising 66 named canes plus six canes regarded as variants of the named. But the expedition had been away longer than expected and had cost more than the original estimate and in his report its leader thought fit to set out in detail the reasons why he was not more successful in obtaining sugar-cane plants. He declared that he had been sent at the wrong time of the year, that all the country from the islands of Torres Strait to Mullen's Harbour had suffered a long drought and that the capacity of the cutter was also a limiting factor. It is paradoxical that one of the very few, successful, Australian plant-seeking expeditions should have had to account for not being more successful.

TO SUBSCRIBERS.

Please renew your subscription without delay. Write your full name plainly, preferably in block letters.

Address your subscription to the Under Secretary, Department of Agriculture and Stock, Brisbane.

Prevention of Frost Damage in Lady Finger Bananas.

L. G. TRIM, Assistant Adviser in Horticulture.

BANANAS are somewhat susceptible to cold injury in southern Queensland, and varieties of the Cavendish type, that is, the Cavendish and its various sports such as Mons Marie and Williams's Hybrid, are usually grown on hillsides above normal frost level. In addition, of course, plantations of these varieties are best located on northerly slopes, ranging in aspect from north-easterly to north-westerly, to ensure shelter from cold winds. The Lady Finger variety, on the other hand, does not as a rule thrive on the hillside sites chosen for the Cavendish and related varieties. Thus we find it grown for the most part on alluvial flats. Many of these situations are subject to frost and frost damage to plantations of this variety is therefore not uncommon. In fact, on some occasions it is so severe that all bunches and mature plants are lost and normal sucker growth does not start again until well into the following summer.

The winter of 1946 was one of the coldest on record in South Coast banana districts. Lady Finger plantings on creek banks in the Currumbin district and elsewhere suffered so severely that it might have seemed useless persevering with them. However, with the return of favourable growing conditions in the spring, new sucker growth responded remarkably and by the winter of 1947 many of these plantations were bunching.

One owner who had suffered considerable loss in 1946 resolved to make an attempt at frost prevention in 1947 in an area of about three acres of Lady Fingers, using a modification of the oil-burning method employed in citrus orchards. This plantation, with the Currumbin Creek forming its south-eastern boundary, was looking exceptionally well at the beginning of winter. The plantation consisted of 18 rows, each of 50 stools, planted 12 feet by 12 feet.

The Method Employed.

Firstly, all bunches round the edges were covered with brown-paper bags. Then seven oblong heaps of sawdust were built, each containing four sacks. Four heaps were equally spaced outside the first row on the north-western boundary of the plantation and the remaining three between the ninth and tenth rows. Once lit, these heaps smouldered continuously and, as they burnt away, they were replenished with more sawdust. This it was found necessary to do every third day.

Plate 53.

Plantation where frost prevention measures were undertaken in 1947, photographed on 18th September, 1947. This area was badly frosted in 1946.

Plate 54.

A second plantation nearby where no frost prevention was attempted, photographed on 18th September, 1947. Also badly frosted in 1946.

Finally, twenty-four 2-lb. fruit tins or tins of a similar size were secured and distributed equally in the third, ninth and fifteenth rows. They were filled, in the first instance, with coal tar, but later distillate fuel oil was added in varying proportions until finally a mixture of equal parts of each substance was decided upon as giving the best burning mixture. The 2-lb. tins then burned for about two hours. The coal tar alone was found to go out while the tin was still about half full, owing to the formation of a heavy soot deposit round the top.

Anti-frost operations were carried out from early in June, when the sawdust piles were lighted, until the middle of August, when the risk of frost seemed remote. Each morning an alarm was set for 4 a.m. and at this time the grower made his forecast. If he considered that a frost was likely the tins of fuel were set alight with a torch. This was done on twelve occasions.

For the whole operation there were consumed 15 yards of sawdust, 29 gallons of coal tar and 4 gallons of distillate oil, in addition to the brown-paper bags. The cost, therefore, was small.

Results.

To all intents and purposes, the steps taken to prevent frost injury were very successful. Only on the south-western edge was there any sign of chilling and it was thought that even this may have been prevented had the burning operations been extended beyond the outside row in this section.

The accompanying plates illustrate the position on 18th September, 1947, on this plantation (Plate 53) and on another one nearby where no attempt was made at frost prevention (Plate 54). Both these areas were badly frosted in 1946 and it seems reasonable to assume that, had the frost prevention measures not been undertaken, both would have suffered to approximately the same extent in 1947. One point of difference between the two years should be noted. In 1946 prolonged cold spells were experienced; in 1947 the cold spells were of short duration though on a number of occasions the minimum temperatures recorded were as low as those in the former years.

Conclusions.

It would be unwise to assume that frost damage to bananas could be prevented in all localities and in all seasons by the method described. Nevertheless, the evidence does suggest that, in view of the low cost involved, the method is worth a trial, at least in particularly valuable areas.

In deciding how to set out the sawdust piles and the fuel tins, due regard would need to be given to the local conditions on each plantation. Much would also depend on the grower's ability to forecast frost on his own farm, unless he was prepared to face the cost of lighting the fuel tins every night.

The effect of brown paper or other covers in reducing cold damage to the actual bunches is, of course, well established.

Acknowledgment.

It is desired to express appreciation to Messrs. G. Wendt and Sons, of Currumbin Creek, for the thoroughness with which they carried out this work and for providing details of the method used.

Summer Lettuce Varieties in the Toowoomba District.

A. M. RICHARDSON, Adviser in Horticulture.

ALTHOUGH production of summer lettuce has been found to be somewhat difficult in all parts of Queensland, the Toowoomba district possesses certain climatic and other advantages over most other parts of the State. The soil in the vicinity of the city is well suited to the raising of small crops. As the natural rainfall is inadequate, the growth of such a crop as lettuce, which especially in the summer must not be allowed to suffer any check, can be undertaken only on farms where adequate irrigation is possible. Although this is in some cases a limiting factor, the water supply is on the whole ample and reliable.

Another advantage is that, while the local demand is appreciable, Toowoomba is also conveniently situated for the consignment of summer lettuce either to Brisbane, where the demand is very great, or to the western towns, so often under-supplied with much needed summer greens.

Varieties.

A trial of lettuce varieties has recently been conducted by the Department of Agriculture and Stock at Middle Ridge. This has given some very definite results which should be of value to local growers as well as to the home gardener. Five varieties were tried and the results clearly demonstrate the superiority of some of the recently developed types as compared with some of the older stand-bys.

The seeds were planted on 6th December. Cutting commenced on 30th January and was completed on 9th February. Blood and bone fertilizer was applied prior to planting at the rate of 350 lb. per acre. Weather conditions during the trial were somewhat severe in that abnormally high temperatures alternated with abnormally low temperatures.

The results of the trial are summarised in the following table:—

Variety.	Percentage of Heads Harvested.	Average Weight of Heads (lb.).
Great Lakes	100	1.01
Imperial 847	100	0.93
Imperial 44	94	0.92
Iceberg	89	0.84
American Summer	81	0.78

From this table it will be seen that not only did all the Great Lakes and Imperial 847 plants produce marketable heads but that the weight of the trimmed heads was in the vicinity of 1 lb. The performance of Imperial 44 was only slightly inferior. However, the other two varieties showed up comparatively poorly.

The Great Lakes plants made uniformly vigorous growth throughout and produced large, dark-green heads, rather flat when mature and of slightly coarse texture. These heads seemed very suitable for transport. The plants showed no tendency to bolt, that is, to run to seed prematurely. One or two diseases made their appearance but were confined to the outer leaves and did not detract in any way from the value of the heads.

The Imperial 847 variety also made uniformly good growth and produced well folded, reasonably solid heads. The plants showed no tendency to bolt and no blemishes appeared.

The performance of Imperial 44 was very similar to that of the other Imperial variety and a very attractive head was produced.

On the other hand, the Iceberg formed an elongated somewhat loose head which was obviously not suitable for transport. The plants also showed a marked tendency to bolt and the leaves were subject to tip burn.

The American Summer lettuce, sometimes also known as Hanson, made very weak growth throughout the trial. The plants failed to form a heart and bolted to seed very early. For this reason they were harvested in an immature condition, but even then a pronounced bitter flavour was in evidence.

Conclusions.

While there appeared to be little difference between the varieties Great Lakes, Imperial 847 and Imperial 44, the impression was formed that at least for this season the first-named variety was slightly superior to the other two. In the same way, it was thought that Imperial 44 was also rather better than Imperial 847, largely because of the very compact head produced. The Iceberg was definitely unsatisfactory, while the American Summer variety proved worthless.

Acknowledgment.

Appreciation is expressed of the co-operation of Mr. B. West, on whose property this trial was conducted.

RADIO TALKS TO FARMERS
(Australian Broadcasting Commission)
4QR AND REGIONAL STATIONS
THE COUNTRY HOUR—Daily from 12.15 to 1.15 p.m.
4QG AND REGIONAL STATIONS
COUNTRY NEWS MAGAZINE—Every Sunday at 9 a.m.

PLANT PROTECTION

Water Blister Disease of Pineapples.

T. McKNIGHT, Pathologist.

INSPECTIONS of a number of representative farms have led to the obvious conclusion that many growers do not yet grasp the fact that infection of fruit with the water blister fungus occurs on their own plantations mainly from spores originating from nearby dumps of infective material and from the floor of the packing shed. Where growers have had considerable water blister losses, inspection of their packing sheds has shown that neglect or carelessness in the disposal of discarded tops, leaves, fruits, knobs and other trimmings has been responsible for the infection of the fruit.

In the summer, particularly over the months of February and March, the water blister fungus enters and rots this discarded material and at the same time forms countless numbers of spores on the surface. These spores are carried in the air and germinate, like seeds of higher plants, after gaining entrance to the fruit through abrasions and bruises on the sides and shoulders of the fruit or through the stem end, and occasionally through the broken top.

During the last summer crop it was again very clearly demonstrated by Departmental experiments that careful attention to hygiene in the packing shed was sufficient to prevent losses from this disease. There is now no excuse whatever for growers to market fruit infected with the water blister fungus. If fruit receive careful handling during picking and packing operations, it is only necessary to see that no infective material is left lying in or around the packing shed to ensure that wastage from water blister is reduced to very small proportions, if not entirely eliminated.

Growers are therefore urged to dispose of dumps of discarded pineapple material by burying or burning and to spray their contaminated sheds thoroughly with a 5 per cent. solution of formalin. It may be noted that packing sheds with dirt floors are not as easy to keep clean and are more difficult and costly to sterilize than those with wooden or concrete floors. From then on growers must adopt a routine for the disposal of discarded tops and other material and maintain a high standard of hygiene in and around the packing shed.

This strict, but simple, maintenance of hygiene associated with careful handling of fruit and the rejection of cracked, sun-burned, "weeping" and "knobby" fruit are the measures adopted by careful growers who rarely receive a report of water blister disease in their southern consignments.

The Itch Mite of Sheep.

G. R. MOULE, Officer-in-Charge, Sheep and Wool Branch.

THE itch mite of sheep* was first recorded in 1940 by Mr. H. B. Carter, of the C.S.I.R.'s McMaster Laboratory, when he detected the presence of this very small parasite in the skin of sheep depastured in New South Wales. It is known to occur in Queensland, but it is doubtful if it is of the same economic importance in this State as in New South Wales.

Plate 55.

A Much Enlarged View of the Itch Mite.

* *Psorergates ovis.*

The mite is particularly small and can be detected only by microscopic examination. It appears to burrow fairly deeply into the skin of sheep and sets up a good deal of irritation, which is reflected in a torn and ragged fleece. The life cycle of the mite is not known, but it appears to remain a permanent parasite in that all of its life is spent on its host. The mite, which is shown in Plate 55, belongs to a group of parasites previously recorded as being common on rodents.

Sheep of any age may be affected, but, because of the slowness with which the mites spread, the incidence of infestation is higher in older animals than in the younger age groups.

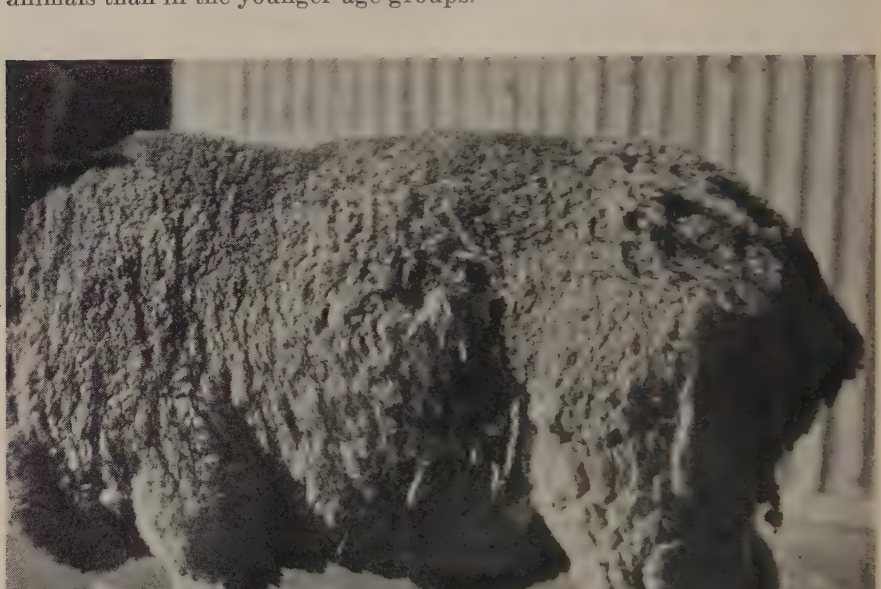


Plate 56.
THE APPEARANCE OF A SHEEP INFESTED BY THE ITCH MITE.

Symptoms Produced.

The symptoms produced by mite infestation vary, depending upon the number of mites and the time they have been on the sheep. Generally speaking, however, the signs shown are typical of those which might be exhibited by any animal suffering from a mild skin irritation. In the early stages sheep in the yards may be seen biting quite vigorously at their sides or thighs. Sometimes they rub against fences or posts. As the result of this the fleece presents a bedraggled, ragged appearance. Loose tassels of tangled wool may hang from the sides or thighs and externally the animals present an appearance typical of lice infestation (see Plate 56). Heavily infested animals may tear away large patches of their fleece as the result of violent rubbing. In horned sheep the front part of the horn may become smooth and polished from rubbing the fleece.

Plate 57.

THE UPPER PICTURE SHOWS NORMAL WOOL, THE LOWER WOOL FROM A SHEEP INFESTED BY THE ITCH MITE.

On closer examination it is found that the staple is inclined to be stringy, has a pointed tip, and contains dry scattered crumbs of scurf (Plate 57). The wool loses its tensile strength and can be broken any where along the staple. The fibres give the impression of having lost their elasticity, as their ends remain straightened out after a small staple has been broken.

In long standing cases the affected animal may be difficult to shear, as the fleece becomes badly cotted, and when it is removed the wool is difficult to tear apart.

The skin itself may not appear greatly altered, though there is an accumulation of scurf on the surface. If the wool is clipped closely a leaden hue is noticeable, and this seems to alternate with paler patches. The skin appears to be tougher than usual. The small "pin row" wrinkles on the skin become thin and hard and feel like a whip cord. In some cases a brownish moist scurf accumulates in greater quantities on the crest of the pin rows, and may even form a definite crust. Generally, however, it is loose, dry, and crumbly.

Course of the Disease.

The spread of mites from sheep to sheep and over an affected animal is very slow. It may take up to three or four years for the mites to spread over the greater part of the animal. Most commonly the wool of the sides, flanks, and thighs shows the effects of infestation first, and it is from these original points that the mites spread slowly in all directions.

Apparently the mites spread most readily from infested sheep which have been freshly shorn to non-infested sheep irrespective of whether these animals have been recently shorn or are woolly. Migration of mites from infested sheep carrying a fair length of wool appears to be uncommon.

Diagnosis.

Itch mite infestation is diagnosed by careful microscopic examination of skin scrapings from sheep which are showing symptoms similar to those described, but which are not suffering from lice infestation.

Control.

Itch mites are easily controlled by dipping affected flocks in lime-sulphur. A solution containing about 1 part of polysulphide sulphur on a weight/volume basis is used. Most lime sulphur concentrates on the market contain not less than 20 per cent. or 25 per cent. active polysulphide sulphur, and accordingly these can be diluted at the rate of 5 or 4 gallons to 100 gallons of water. Six ounces of Agral 3 per 100 gallons can be added to the dip (after the lime-sulphur and water are mixed) as a wetting agent. Even when Agral 3 is added, special care must be taken to see that the sheep are thoroughly wetted; accordingly it is as well to examine the sheep in the draining pen to see that the desired results have been obtained.

On emerging from the dip the sheep are a bright golden yellow colour, but as drying proceeds they become greyish and finally resume their natural colour.

Lime-sulphur solution is very poisonous to sheep, and should they swallow any of the dipping fluid death occurs fairly rapidly. Therefore particular care must be exercised when sheep are dipped.

"Cheesy Gland" or Caseous Lymphadenitis of Sheep.

G. R. MOULE, Officer-in-Charge Sheep and Wool Branch.

CHEESY gland is a disease of sheep which is widespread in Queensland and, although not many affected sheep die, it is of considerable economic importance. It is more than likely that most woolgrowers do not know that the disease occurs amongst their sheep until they accidentally discover that a leg of mutton which has been served for dinner contains an unpleasant abscess, full of yellowish pus, deeply concealed in the muscles. Quite naturally any carcasses affected with the disease are regarded as being unsuitable for export and it is because of this that the disease is of such economic importance.

Cheesy gland is essentially a chronic disease, that is, its course is characteristically slow. Usually it is marked by the formation of "cold" abscesses in the lymph glands which occur in various parts of the body, though it may become generalized and occur in the liver, lungs, spleen and/or kidneys.

It is caused by a specific organism which is particularly prevalent in the soil of sheep yards and recognized "sheep camps." The organism gains entrance to the body through wounds in the skin, but usually does not cause any local lesion. However, it does form one in the nearest lymph gland and produces a typical pus-filled abscess.

As it is a wound infection, cheesy gland is more common in older sheep, that is, ones which have been shorn a number of times and have had a large number of skin wounds inflicted upon them.

Symptoms.

The earliest symptoms include swelling of the affected glands, which may be extremely painful. Later, however, the gland becomes markedly enlarged and hard and presents the typical appearance of a "cold" abscess; that is, there is neither heat nor pain associated with its formation.

The glands most commonly affected are those deep down in the muscles of the hind leg; in the groin, in the flank and on the point of the shoulder. If the glands of the flank or the point of the shoulder develop particularly large abscesses they can be easily felt, and sometimes they burst externally and the wool becomes matted with a creamy-yellowish pus. Should this occur, healing is rapid after the pus is discharged.

If the disease becomes generalized, abscesses may form in the lungs and this can lead to the development of a dry cough, but quite often there are no very apparent symptoms associated with the formation of abscesses in the organs of the body. The causative organism of cheesy gland may spread from abscesses in the kidneys to the bladder, where it has been known to set up inflammation. When this occurs, the affected animal walks with a peculiar straddled gait of the hind legs and has a humped back. It may also urinate frequently.

Post-mortem Findings.

The usual findings on post-mortem examination include enlargement of the lymph glands; if the disease is advanced these contain a yellowish pus, which varies in consistency between that of thick cream and cheese. Sometimes the tissue of the gland is no longer apparent and there is just an encapsuled collection of caseous pus where the gland should be. Such lesions may be as large as a hen's egg.

If the disease has become generalized, single or multiple abscesses may be found in the lungs, kidneys, spleen and, or liver. These contain a characteristic thick creamy-yellowish pus.

Control Measures.

As cheesy gland is essentially a disease associated with wounding of the skin, control measures centre around the adoption of reasonable precautionary measures at lamb marking and shearing.

In the former operation the main points are to keep the instruments clean and to use temporary yards wherever possible. The lambs should be dropped on their feet after marking and the work arranged so that they go straight out into the pasture paddocks and are not held in the yards.

Precautions which might be taken at shearing time include the provision of grating over the counting-out pens and the shearing of young sheep first. In some cases it might be worth while palpating the glands near the surface of the body—that is, those on the point of the shoulder or in the flank—and drafting off any sheep which have enlarged glands. These can be shorn last and in this way the danger of spreading the disease through the gland bursting during shearing and fouling the combs and cutters is obviated.

TRIBUTE TO GRASS.

Grass is the forgiveness of nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated. Forests decay, harvests perish, flowers vanish, but grass is immortal. Beleaguered by the sullen hosts of winter it withdraws into the impregnable fortress of its subterranean vitality, and emerges upon the first solicitation of spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements which are its ministers and servants, it softens the rude outline of the world.

Its tenacious fibres hold the earth in its place, and prevent its soluble components from washing into the sea. It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climates, and determines the history, character, and destiny of nations.

Unobtrusive and patient, it has immortal vigour and aggression. Banished from the thoroughfare and field it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes the throne from which it has been expelled, but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendour, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet should its harvest fail for a single year, famine would depopulate the world.

—*John J. Engalls, U.S. Senator of Kansas,* 1885.

Pink Eye or Blight of Sheep.

G. R. MOULE, Officer-in-Charge Sheep and Wool Branch.

MOST woolgrowers are familiar with pink eye or blight, which commonly affects sheep in Queensland. It is a highly contagious disease; that is, it can be spread readily from sheep to sheep. It is caused by a specific micro-organism.

Pink eye is more common during the summer months, particularly if the seasonal conditions are good, though it can occur at any time of the year. Sheep of any age or sex may be affected and the economic importance of this condition lies in the fact that animals suffering from this complaint are—

(1) Difficult to drove and/or muster.
(2) Retarded temporarily in growth and fattening.
(3) Likely to get cut off from the flock; in this way lambs may be lost or grown sheep may die from misadventure.
(4) Likely to lose the sight from one or both eyes; this can be very important in stud stock.

Transmission of Pink Eye.

One of the most characteristic things about pink eye is the rapidity with which it will spread through a flock. This brings up the interesting question of the way in which the disease is transmitted. It has been clearly demonstrated that the discharge from an affected eye contains the organism which causes the disease and a very small quantity of this discharge is capable, on being instilled into an unaffected eye, of setting up the complaint.

Under field conditions it appears that there are two ways in which the discharge from an affected eye might be transferred to the eyes of a healthy animal. The discharge may be wiped off on to long grass as the affected animal grazes and walks through the pasture and subsequently contact the eyelids and face (in close proximity to the eyes) of healthy sheep as they graze over the same area; or minute quantities of the discharge may be transmitted directly by insects such as "bush flies."

Symptoms.

Pink eye may run one of two courses, mild or acute. The first symptoms to be seen in either case include reddening of the inside of the eyelids and "watering" of the eyes. This discharge mats the hair on the side of the face as a copious flow of tears develops. If the animal is suffering from a mild attack it will usually recover at this stage. If, however, the attack progresses to become acute, the transparent part in the front of the eye (the cornea) shows some opacity, usually referred to as "milkiness," in about two days and the blood vessels of the eyeball become enlarged and inflammed.

As the opacity of the cornea develops the sheep become partly or wholly blind and affected animals experience difficulty in finding their way about their paddocks, in grazing and in watering. In the most acute stage of pink eye the eye is aptly described by stockmen as "a poached egg surrounded by a ball of fire." The whole of the eye becomes white, except for its yellowish centre. The eyelids are actually inflammed and reddened. There is copious discharge from the eye and the animal obviously suffers great pain.

Following the very acute stage the cornea may ulcerate and the eyeball may finally burst, extruding part of its contents. Should this happen the animals may never recover normal sight. If the eyeball does not burst, recovery is uneventful, except that a white scum which regresses slowly may develop on the cornea.

The disease usually takes 10-14 days to run its course on any one sheep but it smoulders slowly through a flock and an outbreak may last from six to eight weeks.

Recovered animals are usually immune for only a few months and accordingly are susceptible to re-infection next "season." Unfortunately some animals remain "carriers" of the causative organisms and in this way act as reservoirs of infection for a fresh outbreak at some subsequent date.

The disease is readily diagnosed on the clinical appearance and on the epidemic proportions it reaches.

Prevention and Treatment.

Prevention of a disease spread through such agencies as long grass and flies is difficult.

Fat-lamb raisers may be able to put their sheep on short crops or a mown pasture and in this way obviate further spread by long grass. This, of course, could not be carried out in the pastoral districts.

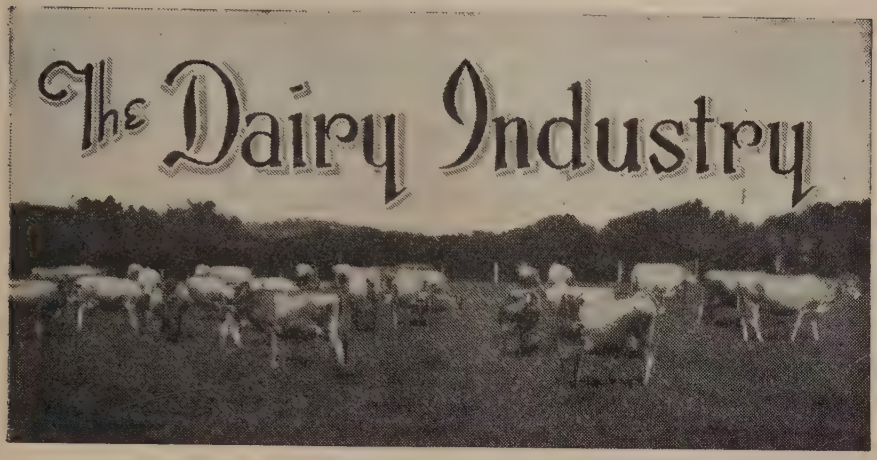
In some experiments carried out recently in the Blackall district a light covering of the head and face of sheep with a fine spray of 1 per cent. D.D.T. used in the form of "Rucide" was reported to reduce bush-fly worry of rams for about three weeks and this might be worth considering in the case of stud sheep which are being hand-fed for show purposes.

More recent work indicates that one part of the drug sulphacetamide mixed with two parts of boracic acid is the most satisfactory treatment. This is used as a dry powder and blown into the affected eye with a De Villoiss powder blower (No. 118).

SHELTER FOR STOCK.

Much can be done to provide shelter for stock by planting trees of suitable type on chosen positions on holdings. Pines and cypresses constitute very useful protection for the purpose and make reasonably quick growth. To obtain the maximum amount of value from those trees, however, they should be fenced off from stock in order to protect the lower branches (which are most important as breakwinds) from becoming eaten or broken off. In bad weather animals will of their own accord take advantage of this form of shelter, as protection from the prevailing cold winds. In the case of lambing ewes, in very severe weather the fence can, if desired, be taken down and the sheep allowed access to the plantation for a day or so without doing any great amount of harm to the trees.

Improvised fences make valuable breakwinds for sheltering stock, and sheds of various descriptions can also be made use of to great advantage. The experience of owners who have used sheds is that there is no difficulty in getting sheep, particularly shorn sheep, to take advantage of them.



Effect of Month of Calving on Production.

S. E. PEGG, Senior Adviser (Herd Testing).

THE month of calving is important in determining the production of dairy cows in Queensland.

In order to ascertain the effect of the month of calving and to indicate which months are the most profitable for calving, a survey has been made of all the grade herd testing records available. Unfortunately, all records prior to 1939 were destroyed some years ago, so the survey was conducted on all completed lactations of 150 to 273 days, recorded from 1939 to 1947, for all Queensland except the Atherton Tableland, where the figures used were from 1934 to 1942.

The survey of some districts showed that the number of recorded lactations for some of the months was not sufficient to give reliable figures.

The average production for the month of March for the Downs had to be calculated from only 19 lactations and this probably accounts for the average for that month being much higher than the averages for February and April.

Similarly, the number of lactations for Central Queensland was small for most months—particularly for February, March and April. This probably accounts for the low average production for March and April.

The period of 8 years includes a wide range of seasonal conditions; therefore the effects of good and bad seasons offset each other.

The survey reveals that in many districts the average production of cows calving in July, August and September is 40 to 50 lb. more than cows calved in the first quarter of the year. The most profitable period for cows to calve varies slightly according to districts.

Dairy farmers should give serious thought to controlling the calvings of their cows in order to obtain the maximum production from each cow. If a cow's production can be increased by 40 lb. of butter fat by calving in July instead of March, why not take advantage of this fact? 40 lb. of butter fat is equal to 48¾ lb. of commercial butter

and at 2s. per lb. commercial butter, this equals £4 17s. 6d. What a difference it would make to the dairymen's income if all cows calving in the first quarter of the year were to calve in July and return their owners an extra £4 17s. 6d. per head!

The general practice in Queensland has been to distribute calvings throughout the year.

There are several reasons for this, some of which are:—

(*a*) At one time there was a demand by the industry to maintain even shipments of butter to Britain throughout the year.

(*b*) Prior to equalisation of prices, there was a higher price paid for butter produced during the winter months. This influenced autumn calvings.

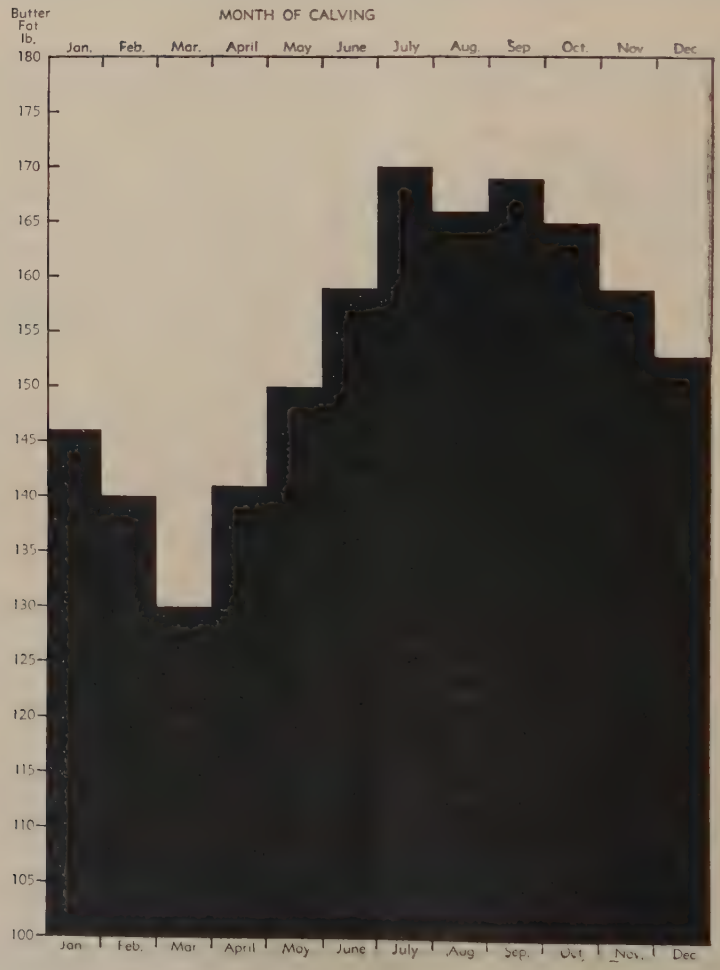


Plate 58.

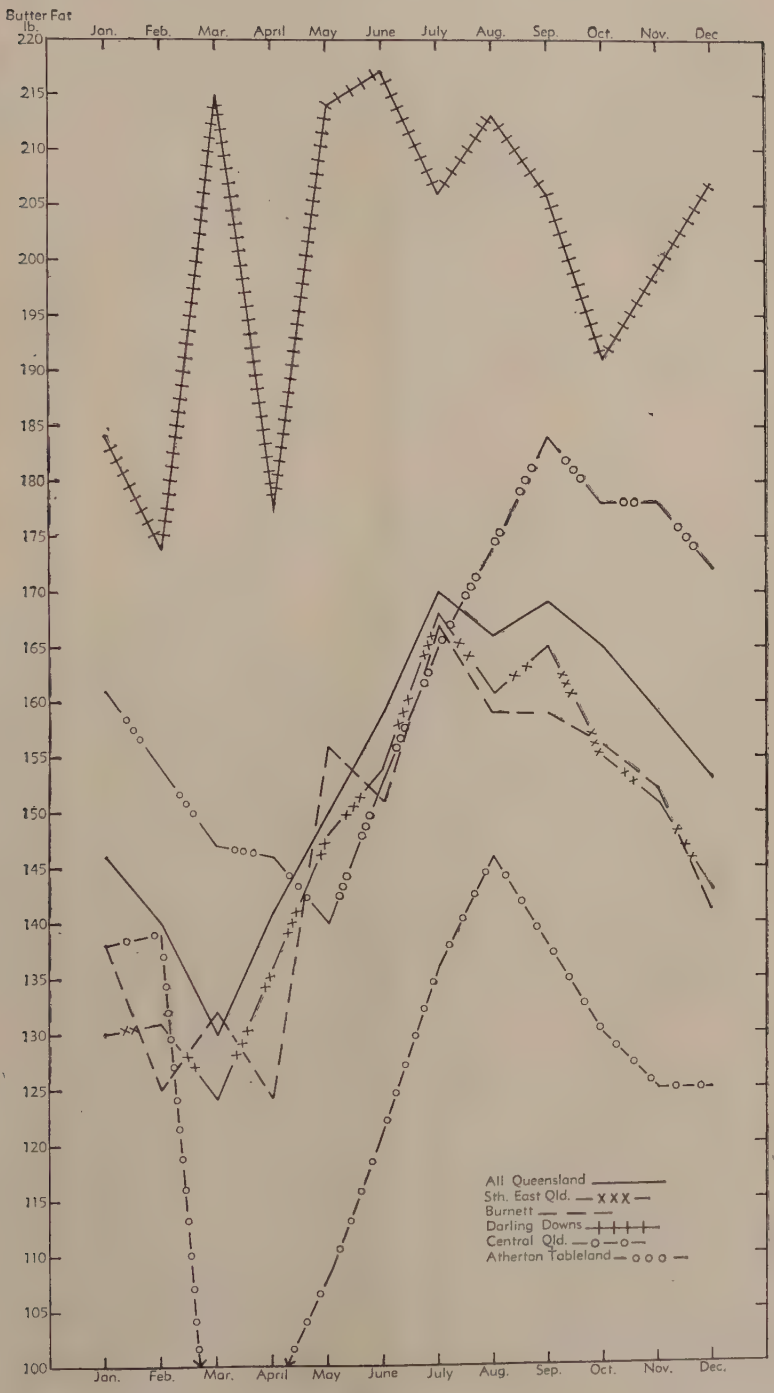

Butter Fat
lb.
Jan. Feb. Mar. April May June July Aug. Sep. Oct. Nov. Dec
220
215
210
205
200
195
190
185
180
175
170
165
160
155
150
145
140
135
130
125
120
115
110
105
100
All Queensland
Sth. East Qld.
Burnett
Darling Downs
Central Qld.
Atherton Tableland

Plate 59.

TABLE 1.

District.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Average and Total.	——
All	146	140	130	141	150	159	170	166	169	165	159	153	157	Average yield butterfat
Queensland	923	556	495	522	563	707	819	723	976	1,310	1,086	907	9,587	Number of lactations
	9·63	5·8	5·16	5·44	5·87	7·37	8·54	7·54	10·09	13·66	11·33	9·46	..	Per cent. of lactations
South-east	130	131	124	136	148	154	168	187	165	155	151	143	150	Average yield butterfat
Queensland	351	259	174	196	213	310	332	404	423	451	485	400	3,947	Number of lactations
Burnett ..	138	125	132	124	156	151	167	159	159	156	152	141	149	Average yield butterfat
	155	96	84	73	80	110	132	168	174	173	194	176	1,615	Number of lactations
Downs ..	184	174	215	177	214	217	206	213	206	191	199	207	202	Average yield butterfat
	47	24	19	29	36	55	70	73	62	57	66	40	578	Number of lactations
Central	138	139	79	97	103	121	136	146	138	130	125	125	129	Average yield butterfat
Queensland	24	15	9	14	24	18	24	47	56	68	53	28	380	Number of lactations
Atherton	161	154	147	146	140	153	165	174	184	178	178	172	164	Average yield butterfat
Tableland	292	178	173	176	180	157	214	202	224	266	248	219	2,529	Number of lactations

(*c*) Factory managers claimed that if farmers maintained even production throughout the year it would enable them to keep down manufacturing costs. This has not worked out according to plan, as it has resulted in a big flush of production in January and February. By all cows calving in July, August and September, it would give the factories a slack period of little or no manufacture during the months of May and June. This would enable the factories to do the much needed annual repairs and overhauls and would also allow their staff to take their recreation leave at the slack period without inconvenience.

Table 1 shows the average production for cows calving in each month in the various districts.

The influence of season of calving is more clearly seen from Plates 58 and 59.

10,000 Milk Smears.

AILEEN M. DELANEY* and PATRICIA M. NAGLE, Dairy Research Laboratory.

ONE of the functions of the Dairy Research Laboratory is the microscopic examination of low-quality raw milks received at Brisbane pasteurizing depots. Each supplier's milk is subjected to the methylene blue test twice weekly, and a smear made of each milk decolorizing the methylene blue within three hours between October and March, and within four hours between April and September. Such smears are made by extracting from the decolorized milk samples less than a drop of milk by means of a sterile platinum wire and placing it on a glass slide to dry. All smears made at the depots are forwarded to the Dairy Research Laboratory where they are stained and examined with a microscope.

According to the types of organisms found on a smear, the reason for the low quality is determined. The sources of contamination, and consequently of low quality, are broadly classified as follows:—

A. Utensil contamination.

B. Environmental contamination.

C. Addition of aged or stale milk.

D. Udder trouble.

The word "utensil" is to be understood in a very broad sense, and is designed to include all dairy equipment with which the milk comes in contact.

The results of the microscopic examination of 10,000 milk smears reveal that the "percentage" causes of low quality were distributed according to the following table:—

A.B. (Utensil and environmental contamination)	74·4 per cent.
C. (Addition of aged or stale milk)	10·0 per cent.
D. (Udder infection)	14·3 per cent.
Unclassified	1·3 per cent.

* Now on the staff of the Brisbane Hospital.

A and B have been grouped because of the difficulty in determining whether contamination has been picked up directly from utensils or from dust-contaminated utensils.

The foregoing percentages are illuminating, and demonstrate in no uncertain terms the main reasons why milks fail to make the methylene blue grade. It cannot be too often emphasized that the three main essentials of quality milk production are—

1. Hygienic methods.
2. Efficient cooling.
3. Healthy cows.

Pure Bred Production Recording, 1946-47.

S. E. PEGG, Senior Adviser (Herd Testing).

PURE bred production recording was greatly affected by the dry weather which prevailed during the latter half of 1946. This resulted in a large number of cows being withdrawn from test, namely 37 per cent.

One of the rules governing the test is that 25 per cent. of registered cows must be tested, but in many cases this was not adhered to because of the dry conditions.

708 cows were due to complete their test during the period from 1st July, 1946, to 30th June 1947; of these 366 cows (51.7 per cent.) passed the standard required for entry into the Advanced Register of the several herd books, 80 cows (11.3 per cent.) did not reach the required standard, and 262 cows (37 per cent.) were withdrawn from test.

The following table gives the figures for each breed:—

Breed.	Number of Cows.		Withdrawn.	Total.
	Passed.	Failed.		
A.I.S.	128	34	131	293
Jersey	227	37	115	379
Ayrshire	3	3	13	19
Guernsey	6	6	3	15
Friesian	2	..	..	2
Totals	366	80	262	708

The attached table gives the averages for the various ages of each breed.

PURE BRED DAIRY CATTLE PRODUCTION RECORDING SCHEME.

BREED PRODUCTION AVERAGES FOR REGISTERED HERD BOOK STOCK WHICH COMPLETED LACTATION RECORDS OF 273 DAYS DURING THE YEAR ENDING 30TH JUNE, 1947.

	Ages of Groups.							
	J2.	S2.	J3.	S3.	J4.	S4.	M.	All Ages.
A.I.S.—								
Number of Cows	41	34	23	16	4	6	38	162
Lb. Milk	6,959·97	6,433·6	8,188·38	8,528·37	8,855·85	8,948·33	8,360·63	7,775·45
Lb. Butterfat	284·296	300·571	339·732	334·328	371·586	343·021	368·563	324·621
Test per cent.	4·08%	4·67%	4·15%	3·92%	4·20%	3·83%	4·41%	4·17%
Jersey—								
Number of Cows	97	32	28	17	15	12	63	264
Lb. Milk	5,322·07	5,016·43	5,514·71	6,293·13	7,063·49	6,475·59	7,320·97	5,996·37
Lb. Butterfat	280·776	305·304	332·578	330·220	367·461	341·735	348·462	324·867
Test per cent.	5·28%	6·09%	6·03%	5·25%	5·2%	5·28%	5·25%	5·42%
Ayreshire—								
Number of Cows	Nil	1	1	2	Nil	Nil	2	6
Lb. Milk	..	5,770·85	7,357·9	8,750·3	..	..	9,365·73	8,226·8
Lb. Butterfat	..	273·439	306·027	338·726	..	..	412·221	346·893
Test per cent.	..	4·74%	4·16%	3·87%	..	..	4·4%	4·25%
Guernsey—								
Number of Cows	3	2	4	1	Nil	1	1	12
Lb. Milk	6,740·17	5,373·77	5,893·75	5,677·75	..	10,312·5	10,606·25	6,761·76
Lb. Butterfat	344·633	272·347	320·425	303·805	..	497·771	511·715	347·798
Test per cent.	5·11%	5·07%	5·44%	5·35%	..	4·83%	4·82%	5·14%
Friesian—								
Number of Cows	2	Nil	Nil	Nil	Nil	Nil	Nil	2
Lb. Milk	8,670·33	..	..	..	..	..	..	8,670·33
Lb. Butterfat	308·389	..	..	..	..	..	..	308·389
Test per cent.	3·56%	..	..	..	..	..	..	3·56%

All Ages and All Breeds—Number of Cows, 446 ; Lb. Milk, 6,580·06 ; Lb. Butterfat, 325·617 ; Test per cent., 4·84.

PRODUCTION RECORDING.

List of cows and heifers officially tested by officers of the Department of Agriculture and Stock, which qualified for entry into the advanced register of the A.I.S., Jersey, Ayrshire and Guernsey Societies' Herd Books, production records for which have been compiled during the month of February, 1948. (273 days unless otherwise stated.)

Animal.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORN.				
MATURE COW (STANDARD 350 LB.).				
Mountain Camp Dahlia	W. D. Davis, Chinchilla	11,992·0	490·108	Lawndale Victor
Navillus Tiddlewinks 8th	E. W. Jackson, Nobby	13,234·6	421·261	Greyleigh Eros
Merridale Dell	Giles Bros., Woowoonga	9,347·05	387·914	Merridale Gentle's Reflection
Lynfield Fay 2nd	A. C. Marquardt, Mondure	11,028·85	378·315	Parkview Ransom
Merridale Stella	Giles Bros., Woowoonga	10,756·8	355·985	Merridale Gentle's Reflection
SENIOR, 4 YEARS (STANDARD 330 LB.)				
Alfa Vale Queenie	W. H. Thompson, Nanango	14,742·15	562·021	Reward of Fairfield
JUNIOR, 4 YEARS (STANDARD 310 LB.).				
Tabbagong Pet 4th (365 days)	J. Crookey, Allora	14,225·75	538·86	Park View Ensign
Navillus Violet 13th	C. O'Sullivan, Greenmount	9,390·7	347·967	Park View Limerick
Bunyaview Charm	K. Berghofer, Westbrook	6,664·8	333·334	Trevor Hill Reflection
Rhodesview Dolly 2nd	K. Berghofer, Westbrook	8,476·8	320·195	Fairvale Major
SENIOR, 3 YEARS (STANDARD 290 LB.).				
Rhodesview Fanny 54th	K. Berghofer, Westbrook	7,639·74	338·983	Rhodesview Neal
Ardilea Bud	W. Hinricksen and Sons, Clifton	7,798·35	328·955	Newstead Reliance
Glen Idol Miss Jean 2nd	Estate P. Doherty, Gympie	8,606·45	320·602	Blacklands Count
JUNIOR, 3 YEARS (STANDARD 270 LB.).				
Bunyaview Duchess 4th	K. Berghofer, Westbrook	8,757·78	388·727	Trevor Hill Reflection
Balatar Maiden	F. W. Fowler, Felton	8,727·5	345·593	Fairvale Dairyman
Palmetto Velvet	R. Tweed, Kandanga	6,569·1	307·161	Sunnyview High Caste
SENIOR, 2 YEARS (STANDARD 250 LB.).				
Glen Idol Princess 2nd	Estate P. Doherty, Gympie	7,873·5	309·659	Glen Idol Regent
Yarranvale Blossom	K. Berghofer, Westbrook	8,488·42	295·164	Alfa Vale Pride 10th
Yarranvale Blue	K. Berghofer, Westbrook	5,940·17	266·627	Sunnyview Royal National
Yarranvale Kitty 3rd	K. Berghofer, Westbrook	6,002·02	262·008	Alfa Vale Pride 10th
JUNIOR, 2 YEARS (STANDARD 230 LB.).				
Springlea Lovely 7th	J. E. Heath, Murgon	9,016·2	336·874	Alfa Vale Standard
Lynfield Golden 3rd	A. C. Marquardt, Mondure	9,577·9	332·343	Parkview Ransom
Faversham Daisy 5th	W. D. Davis, Chinchilla	8,279·2	326·044	Croyden Marchese
Trevor Hill Hope 4th	E. G. Brennan, Wyreema	7,768·39	316·474	Trevor Hill Bosca
Bantry Nectar	D. Sullivan, Pittsworth	8,330·1	299·173	Rosenthal Surplus 2nd
Navillus Countess 5th	C. O'Sullivan, Greenmount	8,542·0	297·1	Parkview Limerick
Ennismore Rosemarie	E. W. Jackson, Nobby	6,981·65	267·187	Navillus Prince Henry
JERSEY.				
MATURE COW (STANDARD 350 LB.).				
Palmridges Iritis	H. Sigley, Jaggan	8,978·75	447·346	Oxford Leanda
Fauvic Recoil	H. Cochrane, Kin Kin	6,893·15	421·851	Shepstone Gallant Lad
Palmridges Jesma	H. Sigley, Jaggan	6,469·35	416·533	Palmridges Don
Glenrandle Golden Lotus	P. Kerlin, Killarney	7,083·0	395·978	Bellgarth Stylish
Inverlaw Sirius	R. J. Crawford and Sons, Kingaroy	7,781·95	382·825	Oxford Royal Lad
Jersey Park Hope	J. McCarthy, Greenmount	6,953·10	367·084	Banule Wolf
Rosallen Nellie	J. McCarthy, Greenmount	6,383·65	361·597	Woodside Par

Senior, 4 Years (Standard 330 lb.).				
Glenrandle Handsome Lady	P. Kerlin, Killarney	6,208·2	371·668	Bellgarth Stylish
Pineview Princess 4th	F. C. Leschke, Wanora	7,109·25	365·571	Pineview Lora's King
Pineview Golden Daisy	F. C. Leschke, Wanora	6,720·45	355·089	Pineview Lora's King
Junior, 4 Years (Standard 310 lb.).				
Hillsdale Babe	A. S. Grant, Greenwood	7,706·15	336·692	Bryn-hyf-ryd Courtier
Glenside Roselea	F. Z. Eager, Neurum	6,474·3	325·725	Glenside Prophet
Senior, 3 Years (Standard 290 lb.).				
Boree Cute Buttergirl	W. and C. E. Tudor, Gayndah	6,989·97	354·826	Trinity Cute Commodore
Glenrandle Fashion Lady	P. Kerlin, Killarney	5,853·8	353·892	Bellgarth Stylish
Lawnview Ada	W. A. Berderow, Fairney View	6,352·8	336·353	Oxford Maxie
Glenrandle Verabelle	P. Kerlin, Killarney	5,792·5	328·327	Bellgarth Stylish
Junior, 3 Years (Standard 270 lb.).				
Navua Beauty Boutilliere 3rd	P. J. L. Bygrave, Aspley	6,728·79	350·691	Navua Mighty Volunteer
Glenrandle Tiny	P. Kerlin, Killarney	5,953·0	338·947	Bellgarth Glory King
Senior, 2 Years (Standard 250 lb.)				
Westbrook Tulip 135th	Farm Home for Boys, Westbrook	7,281·1	375·981	Mornmoot Clementine's Valour
Boree Cute Princess	W. and C. E. Tudor, Gayndah	7,393·37	337·703	Trinity Cute Commodore
Rosalie Midge	G. V. Tilley, Beaudesert	6,751·1	311·071	Rosalie Premier
Hillsdale Dewdrop	A. S. Grant, Greenwood	5,125·65	270·84	Bryn-hyf-ryd Courtier
Junior, 2 Years (Standard 230 lb.).				
Oxford Madge	F. C. Leschke, Wanora	6,195·6	336·866	Glenside Golden Victory
Lawnview Molly	W. A. Berderow, Fairney View	5,938·8	330·684	Oxford Maxie
Lermont Model 2nd	J. McCarthy, Greenmount	5,164·8	330·107	Trinity Noble Effort
Grasmere Monash Semola	F. Z. Eager, Neurum	6,799·15	326·628	Kingsford Monash
Glenrandle Lulu	P. Kerlin, Killarney	5,825·9	319·382	Oxford Noble Peer
Glenrandle Lena	M. J. Kerlin, Killarney	5,436·6	307·553	Oxford Noble Peer
Glenrandle Jerseymaid	P. Kerlin, Killarney	5,969·2	307·49	Bellgarth Glory King
Romsey Dainty Spot	J. Wilton, Killarney	5,657·2	306·592	Oxford Pixies Victor
Glenrandle Spotted Lady	P. Kerlin, Killarney	4,570·2	264·502	Oxford Noble Peer
College Florette 10th	Queensland Agricultural High School and College, Lawes	5,213·15	259·522	Westbrook Ambassador 52nd
Lermont Gaylass	J. Schull and Sons, Oakey	4,417·2	242·132	Trinity Graceful Duke
AYRSHIRE				
Senior, 3 Years (Standard 290 lb.).				
Leafmore Greta Garbo	J. P. Ruhle, Motley	7,250·0	312·195	Leafmore Bonny Jock
GUERNSEY.				
Junior, 4 Years (Standard 310 lb.).				
Bangalow Vale Sunset	W. A. K. Cooke, Witta	5,936·4	334·205	Yarraview Factor

New Beekeeping Legislation.

"THE APIARIES ACT OF 1947."

J. A. WEDDELL, Entomologist, and C. R. R. ROFF, Inspector, *Apiaries Act*.

How the Act Developed.

THE control of beekeeping in Queensland by legislation dates from 1931, when the first *Apiaries Act* was passed. The primary purpose was to give power to deal promptly and adequately with outbreaks of diseases of bees. A natural addition to this was a system of approving and registering apiaries so that inspections for disease would be simplified. It was also required under the Act that any bees or beekeeping materials introduced into the State should be first certified as being free from disease. These basic principles were continued in *The Apiaries Act of* 1938 but, in addition, a certain degree of control of the industry was then included to prevent overstocking of localities or encroachment between apiaries in south-eastern Queensland, where the greater proportion of the apiaries of the State are located.

The degree of protection against encroachment under the Act of 1938, however, proved to be excessive, as relatively small apiaries could hold territory that was capable of carrying a greater number of hives and, consequently, of yielding a much larger crop of honey. New apiaries were required to be established further apart than is now considered necessary and there was thus a tendency also to exclude migratory beekeepers from potentially profitable areas. When a flow is on, good beekeeping country can profitably carry a far greater number of hives than was previously thought to be the case in Queensland. This has been substantiated by instances in this State where beekeepers, by mutual consent as was allowed for under the Act, positioned large apiaries at very short distances apart without detrimental effects. Similar action in the poorer beekeeping country would of course have caused overstocking, but the good business sense of beekeepers would normally prevent this from happening.

To correct the various shortcomings referred to, *The Apiaries Act of* 1947 was passed. This Act is to come into force on 31st March, 1948, and the following explanation of the Act should enable all beekeepers to become conversant with the requirements. The Act is divided into parts and, for convenience, it will be discussed here under headings relating to requirements in declared districts, to the control of disease in the State as a whole, to the prevention of the introduction of disease and also to some general provisions.

Requirements in Declared Districts.

The pastoral districts of Moreton, Darling Downs, Wide Bay and Burnett have been declared as districts for the purposes of Part II. of the *Apiaries Act*. Within this area of south-eastern Queensland a system of registration has been provided which is somewhat different from that under the old Act.

On 31st March in each year, every beekeeper, whether he has one hive or a hundred, must apply for registration and in doing so must supply certain information on a prescribed form regarding his apiary or apiaries. At a later date, he will receive his certificate of registration for the period up to 31st March in the following year. No person is permitted to keep bees unless he applies for registration as a beekeeper. No fees are to be charged under the new Act.

Unless an inspector decides that a locality has become grossly overcrowded, no restrictions will be imposed on the placing of apiaries consisting of less than forty hives, and for convenience these apiaries will be known as Apiaries Class A. Apiaries Class B will be those consisting of forty hives or more. The minimum distance between apiaries of this class has been set down as half a mile.

In addition to the classes already mentioned, two further classes have been established.

An Apiary Class C is one consisting of at least forty hives in which queen bees are bred for sale. A certificate indicating that an apiary is an Apiary Class C will be issued only after the inspector has certified that the apiary is suitable for the purpose. The benefit to be derived from this particular classification is that no other beekeeper will be allowed to commence a new apiary within a radius of one mile of an Apiary Class C. This restriction is provided to help the commercial queen-breeder to maintain the purity of his strain, but it may be noted that any apiary already established within the prescribed limits will not be affected. The holder of a certificate for an Apiary Class C may, however, give consent for any person to establish an apiary within the one-mile radius, subject always to Departmental approval.

Certain apiaries consisting of forty hives or more may be classified as Apiaries Class D. The site of such an apiary is intended to be available as a protected site in the event of the beekeeper desiring from time to time to leave it to follow a honey flow. Before a certificate will be issued, the beekeeper concerned must possess a total of at least one hundred and fifty hives, and in effect the site must be one that the inspector considers to be a suitable and convenient centre for that beekeeper's activities. The owner of an Apiary Class D may remove any or all of his bees from that site to any other site without loss of rights, and in the period between this action and the re-occupancy of this site it will be an offence for another beekeeper to establish an Apiary Class B within the half mile radius. However, in any certificate issued in connection with an Apiary Class D, conditions may be imposed to ensure that such a site is properly "worked" and that other beekeepers are not being unnecessarily restricted in that area. Certificates may be revoked at any time and the number of Apiaries Class D allotted to any one beekeeper will be determined by the Department.

A beekeeper having either an Apiary Class B or an Apiary Class D may give his written consent for any other beekeeper to establish an Apiary Class B or D at a distance of less than half a mile. If an

inspector, after considering the local situation, is of the opinion that the establishment of a new Apiary Class B or D would not prejudice an already established Apiary Class B or D, then permission may be granted for the new apiary to be established and maintained for some determined period.

If a beekeeper sells, establishes or removes an apiary, he must advise the Department of his action within fourteen days.

The keeping of bees on a site may be prohibited if any provision of the Act is being contravened or not complied with, or if the site has become unsuitable for beekeeping, or if the keeping of bees there is detrimental to public interest. Such a site would then become known as a prohibited apiary site. If any person establishes or maintains an apiary upon such a prohibited apiary site he will be guilty of an offence under the Act.

It now becomes necessary for each beekeeper to mark at least one hive in every fifty or part thereof with his registered brand number. This brand number will be supplied to each registered beekeeper on his certificate of registration. The marking must be in block letters and figures not less than two inches high and must always be maintained in a legible condition. The marking is to be placed on the front of the hive, and at least one of the hives marked shall be situated in the front row of hives.

Control of Disease Throughout Queensland.

The part dealing with the control and restriction of diseases and pests affecting bees is by far the most important portion of the Act and it is to be in force throughout the whole State.

Linked with inspectional work is the necessity to have good facilities for examining hives, and as a result beekeepers are required to keep their bees in frame hives maintained in good condition. A badly constructed or neglected frame hive makes effective examination for the presence of disease very difficult.

In the event of a beekeeper noticing a disease in his apiary, he must notify the Department immediately; further, he must not sell or in any way dispose of any bees or materials while they are affected with or liable to spread disease.

Under the Act power is given to the Minister to order the destruction of any diseased bees or disease-affected material. However, such action will follow only if the inspector has certified that in his opinion the diseased apiary is a source of danger to other bees and ought to be destroyed and if his certificate is countersigned by the Director, Division of Plant Industry.

Particular areas or buildings may be declared quarantine areas for the purpose of disease control. Until a quarantine is lifted, no person will be allowed to remove bees or beekeeping material into, within or out of the area.

In connection with disease control, samples may be taken by an inspector for investigation, vehicles stopped and inspected, consignments directed to a quarantine area for investigation, instructions given

regarding methods of treatment to be carried out and generally any other action may be taken or ordered that may be necessary to effect efficient control.

Queensland has been comparatively free from diseases in bees in the past and every endeavour must be made to keep it so in the future. The requirements relating to diseases were designed with this in mind, while at the same time it is hoped that normally they will involve very little inconvenience to the beekeepers.

Prevention of the Introduction of Disease.

In coastal Queensland and along the southern border, certain towns have been listed as places of entry. All bees, bee combs, beeswax, hives, honey and appliances coming into this State must come through one of these listed places. By "appliances" is meant gear or apparatus that has been used in beekeeping but it does not refer to new goods. The places of entry are Bowen, Brisbane, Bundaberg, Cairns, Clapham Junction, Coolangatta, Gladstone, Goondiwindi, Killarney, Mackay, Maryborough, Mungindi, Rathdowney, Rockhampton, Texas, Townsville, Wallangarra.

A consignment coming into Queensland must be accompanied by a declaration completed by the consignee and a certificate must be completed and signed by an approved officer in a Department in the State or country of origin corresponding to the Department of Agriculture and Stock in Queensland to the effect that the consignment comes from a disease-free district. A duplicate copy of this declaration and certificate shall, prior to the introduction, be forwarded to the Department of Agriculture and Stock, Brisbane.

Upon arrival at a place of entry the consignment may be directed to a quarantine area for examination and, if found to be affected by disease, it may be detained in quarantine and treated in accordance with instructions.

A consignment coming into this State without the necessary declaration and certificate shall be either returned to the sender or destroyed in quarantine.

Any consignment coming to the State through a place of entry and accompanied by a properly completed certificate of freedom from disease will not normally be delayed.

General Provisions.

A beekeeper may be required to furnish information regarding queen bees supplied by him or such statistics pertaining to beekeeping as an officer appointed under the Act may reasonably require of him.

In the event of an inspector being satisfied that any bees, hives or appliances have been abandoned and are neglected, he may take possession of them and dispose of them in a prescribed manner or in accordance with instructions from the Under Secretary. This provision may sometimes be very necessary, for an abandoned apiary could easily become a source of nuisance or danger to beekeepers in the locality.

Honorary field men may be appointed and when required to do so may inquire and report on registration of beekeepers, location of apiaries, classification of apiaries, keeping of bees in frame hives, contraventions of the Act or such other matters as may be thought necessary by the Under Secretary. Honorary field men must be registered beekeepers and appointment will automatically lapse if beekeeping is relinquished by them.

The main provisions of the Act may be briefly summarized as follows:—

1. Beekeepers throughout Queensland must keep their bees free from disease and in frame hives to permit of effective examination.

2. Beekeepers in the declared districts must register, provide descriptions of their apiaries, maintain a distance of at least one-half mile between apiaries of forty hives or more, and display their brand number on their hives.

3. All introductions of bees, honey, &c., must be certified as having come from an area free from disease.

Plate 60.
WEIR UNDER CONSTRUCTION ON THE LOCKYER.

MARKETING

The Butter Marketing Board.

The election of six growers' representatives on The Butter Marketing Board for a period of three years from 1st January, 1948, resulted as follows:—

	Votes.		Votes.
*Adolph Gustav Muller, Boonah ..	346	*William James Sloan, Malanda ..	170
*August Hermann Bulow, Mulgeldie	339	David John Caulley, Sexton ..	122
Otto Ottosen Madsen, Yangan ..	243	John Braithwaite, Burncluith ..	99
*Thomas Flood Plunkett, Beaudesert	241	Cecil Ormsby, Buranda	92
*James Purcell, Toowoomba ..	220	Percival Kidd, Malanda	64
*James McRobert, Maryborough ..	212		

The Cheese Marketing Board.

The operations of The Cheese Marketing Board will be extended for a further period of six years from 1st January, 1948. The referendum on the question of the continuance or otherwise of the Board's operations resulted as follows:—

For continuance	100
Against continuance	17

Voting at the election of three growers' representatives on the Board for the three years term commencing 1st January, 1948, resulted in the return of the present members. Voting details:—

	Votes.		Votes.
Malcolm McIntyre, Pittsworth ..	117	David Gabriel O'Shea, Southbrook	88
Reginald C. Duncan, Toowoomba	95	William Alfred Latham, Goomeri	51

Egg Marketing Board.

The election of five growers' representatives on The Egg Marketing Board for a period of three years from 1st January, 1948, resulted as follows:—

	Votes.
District No. 1.	
R. B. Corbett, Woombye	124
*C. J. Nielsen, Bundaberg	76
District No. 2.	
N. G. Seymour, Darra	105
R. E. Slaughter, Aspley	104
District No. 3.	
*E. C. Knoblauch, Upper Mount Gravatt	194
W. R. Kempson, Wynnum Central	111
District No. 4.	
*C. F. Kuss, Marburg (returned unopposed)	
District No. 5.	
*H. Obst, Shepperd	87
O. A. W. Evans, Warwick	75

World Output of Potatoes.

World output of potatoes is slightly below that of last year, and considerably below that of the 1935-39 period average. Preliminary estimates by the International Federation of Agricultural Producers for the 1947-48 season indicate a crop of almost 190,000,000 tons, which is 16 per cent. below the pre-war average, from an area of approximately 51,000,000 acres.

* Denotes sitting member.

GENERAL NOTES

Oat Crop Pool.

The Minister for Agriculture and Stock (Hon. H. H. Collins) announced recently that he had been advised that Queensland would be included in the arrangements made by the Commonwealth Government to establish a pool for the sale of 1947-48 oat crop. A guaranteed first advance payment of 3s. 6d. per bushel would be paid and additional payments would be made as the exportable surplus was disposed of. The Australian Barley Board, Adelaide, is the authority handling the oats on behalf of the Commonwealth Government and arrangements are now being made by this body to appoint an agent in Queensland for the intake of the crop.

Mr. Collins stated that Queensland oat growers who delivered to the pool would share in any profit resulting from the high export prices, and referred to a recent announcement by the Federal Minister for Commerce and Agriculture (Hon. R. T. Pollard) which indicated that the British Ministry of Food will accept up to 12 million bushels at a price equivalent to 11s. 6d. a bushel f.o.b.

The Australian Barley Board has advised that oats will not be purchased on Commonwealth Government account unless they are packed in good, sound, second hand corn-sacks, that the oats must conform to a minimum standard quality and that growers will be required to hold their oats until advised by the agent of the Board to make delivery. Growers will be responsible for storage arrangements prior to trucking and for any cost incurred up to that stage.

Farmers Protected.

Purchasers of all kinds of medicines advocated for the treatment of animals and birds are fully protected under the Queensland Veterinary Medicines Acts administered by the Department of Agriculture and Stock.

Manufacturers of these products are required to register their preparations by lodging with the Registrar the full formula accompanied by labels and directions for use.

Every year registration is refused for many medicines. Exaggerated claims regarding those remaining on the approved list are prohibited. The perusal of the labels on the preparations now on the market will disclose a degree of modesty in claims for use of the preparations that was absent before the enactment of this legislation.

It would be an offence against the Acts to suggest that any preparation would prevent or cure cancer, tuberculosis, or contagious abortion.

A continual inspection is maintained of the goods being offered for sale, and samples are obtained many of which are subject to analysis. This legislation not only assists the cattle, pig and sheep men, but also protects the keeper of any horse, donkey, goat, dog, rabbit, poultry, pigeon or bird in captivity.

Veterinary Science Scholarships.

Following the institution of veterinary science scholarships in 1945 to provide for the recruitment of future appointees to the veterinary staff of the Department of Agriculture and Stock, five-year scholarships have been allotted to Messrs. W. R. Ramsay (Windsor), L. L. Callow (Mackay), M. D. McGavin (Ashgrove), J. N. Shelton (Emerald), and R. G. MacDonald (West End).

Under present arrangements, scholarship-holders are required to take the first, second, and third years of their course at the University of Queensland, and, in the event of the non-establishment of the Veterinary School at the Queensland University, they shall afterwards complete their course at the University of Sydney.

In addition, a two-year scholarship in veterinary science has been allotted to Mr. B. Parkinson (Tennyson). This scholarship covers the fourth and fifth years of Mr. Parkinson's course, which will probably be taken at Sydney University.

Rural Topics

Soil Fertility on the Dairy Farm.

Dairy farming can be hard on pastures unless precautions are taken to maintain soil fertility, particularly in respect to potash. Essential plant food, including potash, is removed from pasture paddocks by the grazing animals, and accumulates in the night paddocks or leaves the farm in the drainage from the milking sheds.

The accumulation of fertility in the night paddocks can be turned to good advantage by growing fodder crops in alternate years, and feeding these back on the outlying paddocks while the dung and urine left at the yards can be conserved by the installation of a manure pit where all the animals' excreta is collected. Farmers who have put in manure pits are most enthusiastic about the benefits obtained from spreading the liquid manure over the pastures. A pump is necessary to lift the manure from the pit, and periodical cleaning out is necessary to remove the sludge that accumulates at the bottom.

The usual method of distribution is to fit up some kind of tank on to a lorry and allow the liquid manure to discharge through a pipe on to a spreading-board beneath the outlet at the rear. As liquid manure corrodes iron-work fairly rapidly, it is desirable to use brass fittings where practicable and to coat the iron-work with bitumen or tar.

Regular use of farmyard manure will reduce the annual fertilizer bill.

—W. D. Andrew, M.Ag.Sc., Pasture Research Officer of the Victorian Department of Agriculture.

Use Penetrating Oil.

A can of penetrating oil should be on every farm workshop bench, and should be used freely on rusted nuts and bolts that have to be unscrewed, on bushings and pins before removing, and, in fact, any part that is rusted or gummed badly. It should be applied at least an hour before the part has to be removed. It can be purchased or made of equal parts of turpentine and kerosene, with a little denatured alcohol added.

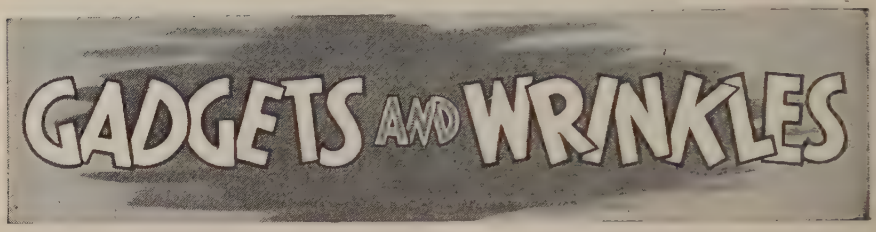
Feeding the Dry Cow.

The few weeks that dairy cows are out of production is a most important period. During this time, the cows must not only replace body tissues lost during the previous lactation, but also build up reserves for their next lactation. During the first few weeks after calving cows may not receive sufficient nutrients to provide for the amount of milk they are producing. They are then said to be "milking off their backs" for they must draw on body tissue for milk production and in consequence they lose flesh.

When a cow calves in low condition she has to produce milk and build up her strength at the same time and, as a result, production suffers. All cows should be in good condition at calving.

The necessity to hand-feed dry cows, frequently referred to as "steaming up," will depend primarily on the season. Given good autumn rains there may be sufficient green feed in the paddocks to make it unnecessary to provide a supplementary ration. However, if pastures are short, and particularly during the winter, enough additional feed in the form of silage and hay should be fed to keep the cows in the desired condition.

Since supplementary fodders of all kinds will be in short supply on most farms, cows which may have been dry for a considerable period and are already carrying a reasonable amount of flesh should be allowed only sufficient feed to maintain their condition.



"Penetration" Method of Laying Cement.

The cement penetration method of laying cowyard and other floors has particular merit in these days of cement and labour scarcity. Compared with ordinary premixed concrete, it takes about one-third less cement and is not nearly as laborious as the orthodox method.

Officers of the Victorian Department of Agriculture point out that, with this system, the metal or coarse aggregate is spread in a regular layer over the area to be concreted. The foundation needs to be solid and level. The metal should be free of dust, and laid to a depth of about 4 inches. The size of the metal should not be less than 1 inch-2 inch or 2½ inch metal is recommended. Small metal compacts, when rolled, thus preventing the penetration of the cement grout. The metalled surface is thoroughly rolled or tamped, and sprinkled with water so that the dry stone will not absorb water from the cement mixture.

It is then penetrated with a grout mixture consisting of 1 part of cement to 3 parts of fine clean sand, with sufficient water to make a thin creamy emulsion, which is poured over the metal to flush the layer of metal to the surface, and this will completely fill all the intervening voids and spaces. After about 30 minutes, the penetrated surface is coated with a layer of about ½ inch of a stiff grout consisting of 1 part cement to 2½ or 3 parts of sand, mixed in the ordinary way and worked into place by the usual screeding. After about an hour, it can be hand-trowelled. Construction joints, if desired, can be made by cutting through the penetrated surface with an axe before the top layer of stiff grout is laid. The top layer will fill the joints cut with the axe. A jointing tool can then be used to cut through the full thickness of the mass, thus completely separating the slabs. With this method the maximum amount of stone is incorporated into the floor with a minimum of sand cement mixture. The work calls for no great skill beyond the experience of the average handyman.

"Don'ts" for Pig Producers.

DON'T firebrand on valuable part of pig. Body tattooing is best. If you must firebrand, do so on the back of the neck and use a small brand.

DON'T feed pigs on morning of despatch, but provide plenty of clean water.

DON'T use faulty races.

DON'T kick pigs.

DON'T prod with sticks.

DON'T drive pigs with whips, sticks, or wire.

DON'T load pigs in dirty trucks.

DON'T overcrowd pigs in trucks.

Firebranding, bruises or lacerations impair the market value of the finished carcase and result in its rejection for export. Producers, agents, drovers, abattoir employees, railwaymen and saleyard authorities are urged to co-operate in preventing these and other injurious practices.

Careless Handling Means POOR TRADE, LOWER PRICES, DAMAGED REPUTATION.

Care of Mother and Child.

Under this heading an article supplied by the Maternal and Child Welfare Service of the Department of Health and Home Affairs, dealing with the welfare and care of mother and child, is published each month.

THE GROWING CHILD AND HIS FOOD.

LAST month we gave some suggestions for training the baby to eat solid foods. Now we must consider in more detail the food requirements of children. The bodies of children are built up from the food they eat, and if the wrong foods are given their bodies will be poorly developed—the bony structure will not be strong and the muscles lacking in tone. In addition, badly fed children are easy victims of all kinds of infections, and one finds that they tire very easily, are always ailing, and soon help to crowd both the wards and the out-patients' department of our hospitals.

For adequate growth and good health every child must have sufficient food to supply his needs for energy and heat, and *most importantly* a good quantity of body-building food. The foods which build the body are called proteins, and the best proteins are found in foods from animal sources, milk, cheese, eggs, meat, and fish. There is some protein in our cereal foods, such as bread and porridge, and a certain amount in some vegetables, particularly peas and beans and potatoes, but the cereal and vegetable proteins are not such effective body builders as the animal proteins.

Owing to lack of knowledge of the value of foods and certain wrong ideas about the protein needs of adults, many children have far too much bread and jam and cake and sweets, and far too little body-building food. It may surprise many parents to know that a boy and girl of ten years of age needs as much protein as a grown man; after that age the needs of a boy are rather higher than those of a girl, and at age 16 both boys and girls need *more protein*, especially the milk, egg, and meat proteins, than a grown man. If father does manual work he needs extra energy food, but not as much protein as his young son and daughter, because he is fully grown and they are not.

Young bones have to be built up and hardened by a mineral we call calcium or lime, and the best source of this is milk. A fair quantity is contained in green leafy vegetables. Iron for making red blood is found in liver, egg yolk, and some vegetables and fruits. Most people have heard of vitamins. These are good factors which help the body to use foods properly and so get all the benefit from them. If children have the foods already mentioned, and their bread and porridge is made of whole wheatmeal or oatmeal and they eat wholemeal bread with their full ration of butter, they should obtain enough of all the vitamins.

Appetite.

The well child offered a good mixed diet, well cooked and nicely served at regular intervals, will have a good appetite. If his appetite becomes poor, be sure that he is having sufficient rest, fresh air, sunshine, and exercise, and is in good physical condition. The doctor at your local Toddler's Health Centre or your family doctor should be consulted if poor appetite persists.

Any further advice on this and other matters connected with children may be obtained by communicating personally with the *Maternal and Child Welfare Information Bureau*, 184 *St. Paul's Terrace, Brisbane*, or by addressing letters *Baby Clinic, Brisbane*. These letters need not be stamped.

IN THE FARM KITCHEN.

Tomato Soup.

One and a-half pints bottled tomatoes, 2 teaspoons sugar, ½ pint water, 2 tablespoons fat, 2 tablespoons flour, 2 cloves, salt and pepper to taste. Turn tomatoes into a saucepan. Add water, sugar, cloves, and cover. Simmer for 20 minutes. (Pick out cloves.) Rub through a sieve. Melt fat. Add flour. Stir till turning colour, then add soup gradually, but stirring constantly. Heat to boiling point. Season with salt and pepper. For four persons.

Pumpkin Soup.

Two breakfast cups cooked mashed pumpkin, 2 pints milk, 1 pint water, 3 tablespoons flour, 1 tablespoon butter, 1 onion, 1 piece celery, salt, pepper, nutmeg. Mince the peeled onion and the piece of celery, place in basin and pour the boiling milk and water over them. Leave ten minutes. Put the pumpkin into a saucepan, stir in the butter and flour, beat well together. Add the seasoning, being careful not to overdo the grated nutmeg. Strain the milk free from celery and onion, pour over the mixture in saucepan, stir thoroughly, and cook gently for 15 minutes. Try this soup with vegetable marrow instead of pumpkin, but at the last moment before serving the secret is to add three tomatoes halved and fried.

Bacon Balls.

A few slices of fat bacon and pieces of the crumb of the bread (about the size of a walnut), 1 hard-boiled egg, pepper and salt. Remove the rind of the bacon and dip the pieces of bread into hot dripping. Wrap a piece of bacon around each piece of bread, and secure with a tiny skewer. Fry in the usual way, and dish heaped up, and surrounded with fried potatoes. Sprinkle with chopped parsley and grated hard-boiled eggs.

Savoury Potatoes.

Three large potatoes, cooked meat, chutney or pickle. Wash and dry potatoes and bake in their jackets. When cooked make an opening in centre, scoop out a little potato, mix with finely chopped meat, and flavour with chutney or pickle. Fill potatoes, reheat in oven and serve hot.

Candied Orange Peel.

Take the peel of two oranges, cut it in sections and remove as much as possible of the pith. Then cover with cold water, bring up to the boil and cook slowly until soft. Drain, then cut the peel into thin strips, and put them into a saucepan with ½ cup of sugar and ¼ cup of cold water. Bring to the boil and boil for about 20 minutes. Cool on a plate and roll in granulated sugar.

Lightning Layer Cake.

Three ounces butter, 4 oz. sugar, 2 teaspoons baking powder, lemon essence to taste, 1½ teacups flour, 2 eggs, pinch of salt, milk as required. Beat sugar and butter to a cream. Beat eggs and turn into a teacup and fill up with milk. Add to the sugar and butter and beat well. Sift flour with baking powder and salt, and lightly stir into other mixture. Beat well and add lemon essence to taste. Divide equally between two greased sandwich tins. Bake in a moderately hot oven for about 25 minutes. Stand for two minutes after removing from oven, then turn out gently on to a lightly-sugared paper. When cold, sandwich with jam and spread top with chocolate icing if possible.

QUEENSLAND WEATHER IN FEBRUARY.

During February the Peninsula North District received slightly over average seasonal rains, and the Warrego and Far South-west areas benefited by variable storms in the middle of the month, as well as during the last few days. These two districts averaged 294 and 433 points, respectively, and in the adjacent Lower West average distribution of 195 points was recorded. All other districts were below average, though Central Coast East and West Divisions registered useful to local heavy totals from the 8th to the 10th. In general, the dry conditions of January continued over most of the State until the end of the month, and it was not until the 23rd that belated activity in the northern tropical air belt penetrated southward into the Gulf of Carpentaria. This intermittent southward movement continued and ultimately fairly useful to local heavy rains were recorded in many districts of the State in the last two days of the month. In the agricultural and dairying districts of the south-eastern quarter and central coast areas considerable relief was afforded rapidly drying areas and the unusual risks of bush and grass fires were eliminated. Some central interior areas and parts of the Central Highlands missed the main distribution and have had little or no useful rain since December, and these districts need early and soaking rains. In the North-west and Carpentaria further rains of a variable nature in the first few days of March should be beneficial, and in the South-west the over-average falls of February were also supplemented by many one to two inch totals.

Pressure.—On the 18th a cyclonic storm developed off the north-west coast of Western Australia and this storm ultimately brought widespread floods over inland Western Australia. Greater activity in the tropical warm front over northern waters developed into the first inland monsoonal movement of the year, and a shallow circular formation was shown in the Gulf of Carpentaria on the 23rd. This drifted south-west into the Northern Territory and through the central interior of the Continent. During this period a steady North-East to North circulation of warm, moist air was maintained in Queensland, and on the 28th the central interior shallow depression was shown lying to the east of Alice Springs, with cold front movements approaching through South Australia. These controls moved east and during the 28th-29th brought useful to relief rains over most of the State.

Moderate seas with north-east winds were reported on parts of the central and south coasts 25th to 29th. On the 1st a tornadic squall caused structural damage at Aramac.

Temperatures.—Maximum temperatures, except Cairns, generally above average from 0.5 deg. at Thargomindah to 4.9 deg. at Boulia, 4.8 deg. Camooweal, and several others approximately 3 to 4 deg. Minimum temperatures were mostly below normal along the coast. In the central-west and upper west, however, averages were above normal from 1.8 deg. at Cloncurry to 4.1 deg. at Boulia, while Mitchell was also 3.1 deg. above normal. Days over 100 deg.: Boulia 28, Winton and Urandangie 24, Richmond 22. Highest daily temperature Camooweal 111 deg. (6th), Windorah 111 deg. (5th). Lowest screen minimum Stanthorpe 49 deg. (16th). Minimum temperatures over 80 deg. Boulia 13 nights, Cloncurry 10, Quilpie 7, Isisford 7.

Brisbane.—Mean pressure $\frac{9+3}{2}$ 29.946 ins., Normal 29.903 ins. *Temperatures.*—Mean maximum 83.1 deg., normal 84.3 deg.; mean maximum 68.8 deg., normal 68.6 deg.; mean temperature 75.9 deg., normal 76.5 deg.; highest daily 91.3 deg. on 27th, lowest daily 64.8 deg. on 26th.

Rainfall.—330 points on 13 days, average 628 points on 13 days.

Sunshine.—211.6 hours, highest since 1938 (249.1).

The rainfall position is summarised below—

Divisions.	Normal Mean.	Mean February, 1948.	Departure from Normal.
	Points.	Points.	Per. Cent.
Peninsula North	1308	1549	18 above
Peninsula South	896	415	54 below
Lower Carpentaria	617	249	60 ,,
Upper Carpentaria	556	141	75 ,,
North Coast, Barron	1288	896	30 ,,
North Coast, Herbert	1477	876	41 ,,
Central Coast, East	792	601	24 ,,
Central Coast, West	475	468	1 ,,
Central Highlands	351	138	61 ,,
Central Lowlands	310	109	65 ,,
Upper Western	304	103	66 ,,
Lower Western	195	196	1 above
South Coast, Port Curtis	576	463	20 below
South Coast, Moreton	658	390	41 ,,
Darling Downs, East	304	227	26 ,,
Darling Downs, West	233	119	49 ,,
Maranoa	282	186	34 ,,
Warrego	209	294	41 above
Far South-West	165	433	162 above

Commonwealth of Australia, Meteorological Bureau, Brisbane.

ASTRONOMICAL DATA FOR QUEENSLAND.

APRIL.

Supplied by W. J. NEWELL, Hon. Secretary of the Astronomical Society of Queensland.

TIMES OF SUNRISE AND SUNSET.

At Brisbane.			MINUTES LATER THAN BRISBANE AT OTHER PLACES.					
Date.	Rise.	Set.	Place.	Rise.	Set.	Place.	Rise.	Set.
	a.m.	p.m.						
1	5.57	5.47	Cairns	20	38	Longreach	31	39
6	6.00	5.41	Charleville	26	28	Quilpie	36	34
11	6.02	5.36	Cloncurry	44	56	Rockhampton ..	6	14
16	6.05	5.30	Cunnamulla ..	30	28	Roma	16	18
21	6.08	5.26	Dirranbandi ..	20	18	Townsville	18	33
26	6.10	5.21	Emerald	15	23	Winton	35	45
30	6.12	5.18	Hughenden ..	29	41	Warwick	5	3

TIMES OF MOONRISE AND MOONSET.

At Brisbane.		
Date.	Rise.	Set.
	p.m.	p.m.
1	11.05	12.47
2	11.59	1.36
3	..	2.21
	a.m.	
4	12.55	3.00
5	1.50	3.34
6	2.45	4.06
7	3.39	4.36
8	4.32	5.05
9	5.26	5.34
10	6.21	6.04
11	7.18	6.37
12	8.19	7.15
13	9.21	7.58
14	10.25	8.49
15	11.28	9.47
	p.m.	
16	12.28	10.50
17	1.22	11.58
18	2.10	..
		a.m.
19	2.53	1.06
20	3.31	2.13
21	4.06	3.18
22	4.40	4.22
23	5.15	5.26
24	5.51	6.30
25	6.31	7.34
26	7.14	8.37
27	8.02	9.38
28	8.54	10.36
29	9.49	11.29
		p.m.
30	10.45	12.16

MINUTES LATER THAN BRISBANE (SOUTHERN DISTRICTS).

Charleville 27; Cunnamulla 29; Dirranbandi 19;
Quilpie 35; Roma 17; Warwick 4.

MINUTES LATER THAN BRISBANE (CENTRAL DISTRICTS).

Date.	Emerald.		Longreach.		Rockhampton.		Winton.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	30	9	46	24	21	0	53	26
6	25	14	41	30	16	5	47	34
11	14	25	30	41	5	16	34	48
16	9	30	25	44	0	20	26	53
21	18	22	34	38	9	13	38	43
26	29	11	44	26	19	1	52	29
30	29	10	45	24	20	0	52	27

MINUTES LATER THAN BRISBANE (NORTHERN DISTRICTS).

Date.	Cairns.		Cloncurry.		Hughenden.		Townsville.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	55	3	68	32	51	18	45	4
3	54	5	67	34	51	20	44	6
5	47	13	63	39	47	24	39	13
7	38	23	56	45	41	30	32	20
9	28	32	50	53	34	38	24	28
11	18	43	42	59	27	45	16	36
13	8	51	36	64	21	50	8	43
15	3	55	34	67	18	52	4	45
17	6	50	35	63	20	49	6	42
19	15	46	40	61	25	47	14	38
21	27	35	48	55	33	40	22	30
23	38	23	56	45	41	30	32	20
25	48	11	63	38	48	23	40	11
27	55	4	68	33	51	19	45	5
29	55	3	68	32	51	18	45	4
30	53	4	67	33	50	19	44	5

Phases of the Moon.—Last Quarter, 1st April, 8.25 p.m.; New Moon, 9th April, 11.16 p.m.; First Quarter, 17th April, 5.42 a.m.; Full Moon, 23rd April, 11.28 p.m.

At the middle of the month the Sun will rise and set 12 degrees north of true east and true west respectively, and on the 8th and 22nd the Moon will rise and set approximately at true east and true west.

Eclipse of the Moon.—A partial eclipse of the Moon will occur on 23rd April, but only a very small portion of the moon's disc will pass through the earth's shadow. The eclipse will begin at 11.20 p.m. and end at midnight.

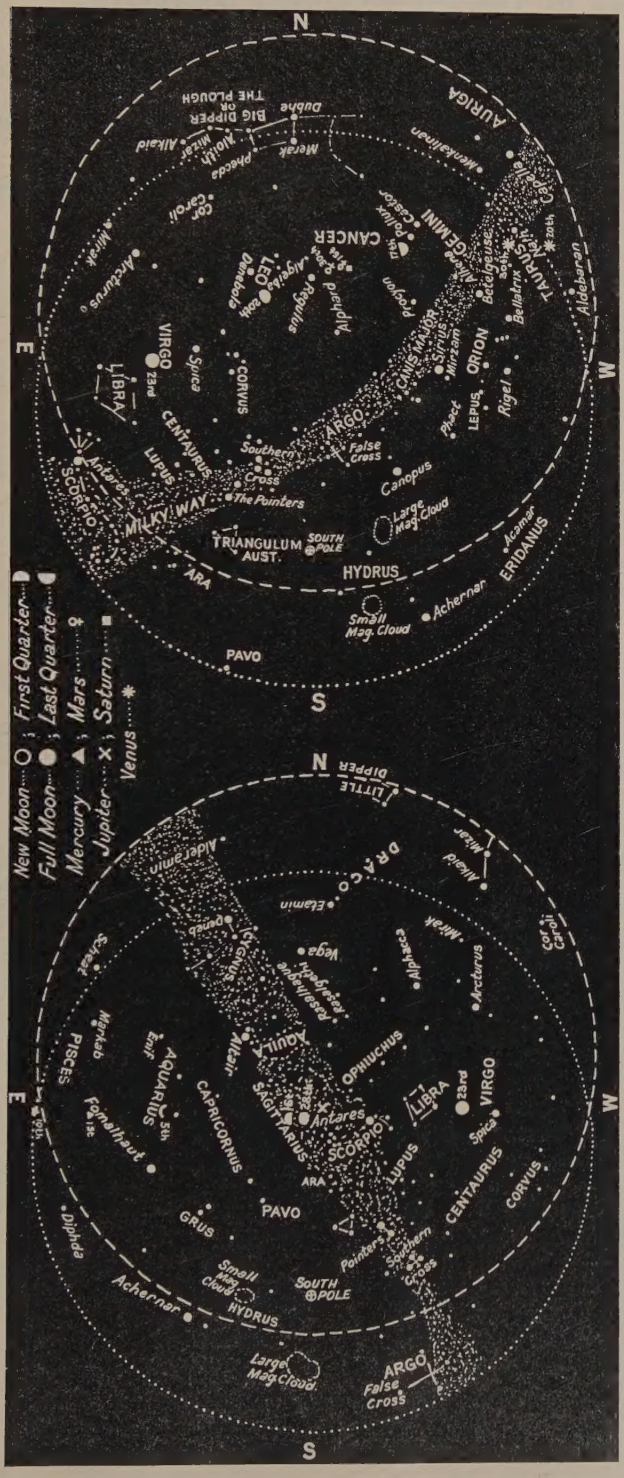
Mercury.—Will be a morning object nearly all this month. On the 1st in the constellation of Pisces it will rise one hour 45 minutes before the Sun. On the 29th it will be in line with the Sun and at the close of the month, in the constellation of Aries, it will rise and set with the Sun.

Venus.—In the constellation of Taurus, will reach its greatest angle east of the Sun on the 15th, when it will set about 2½ hours after sunset.

Mars.—In the constellation of Leo will be close to Saturn at the beginning of April, but during the month it will move towards Regulus. It will rise during the afternoon daylight hours and will set near midnight.

Jupiter.—In the constellation of Sagittarius, on the 1st, will rise between 10 p.m. and 11.15 p.m. and on the 30th between 8.15 p.m. and 9.30 p.m.

Saturn.—Though fainter than Mars, will be conspicuous in the eastern evening sky. At the beginning of the month it will be west of and slightly south of Mars.



Star Charts.—The chart on the right is for 7.15 p.m. in the south-east corner of Queensland to 8.15 p.m. along the Northern Territory border. On the 15th April (for every degree of longitude we go west the time increases 4 minutes). The chart on the left is for 9 hours later. On each chart the dashed circle is the horizon as viewed from Cape York and the dotted circle is the horizon for places along the New South Wales border. When facing north hold "N" at the bottom; when facing south hold "S" at the bottom and similarly for the other directions. Only the brightest stars are included and the more conspicuous constellations named. The stars which do not change their relation to one another, moving east to west, arrive at any selected position about 4 minutes earlier each night. Thus, at the beginning of the month the stars will be in the positions shown about 1 hour later than the time stated for the 15th, and at the end of the month about 1 hour earlier than that time. The positions of the Moon and planets, which are continually changing in relation to the stars, are shown for certain marked days. When no date is marked the position is for the middle of the month.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

FEBRUARY RAINFALL.

(Compiled from Telegraphic Reports.)

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Feb.,	No. of years' records.	Feb., 1947.	Feb., 1948.		Feb.,	No. of years' records.	Feb., 1947.	Feb., 1948.
North Coast.	In.		In.	In.	*South Coast—contd.*	In.		In.	In
Atherton	11·44	42	12·39	3·65	Caboolture	7·82	67	15·44	5·98
Cairns	16·30	61	14·99	9·64	Childers	6·42	48	21·33	3·25
Cardwell	17·00	71	52·38	15·41	Crohamhurst	12·48	50	27·30	6·48
Cooktown	13·71	67	12·27	13·15	Esk	5·24	56	6·43	1·81
Herberton	8·63	57	10·61	4·09	Gatton College	3·52	44	4·87	1·96
Ingham	17·12	51	32·52	7·94	Gayndah	4·20	72	8·22	3·80
Innisfail	23·07	62	32·94	14·18	Gympie	6·58	73	15·98	7·04
Mossman	20·86	19	13·45	14·27	Kilkivan	4·91	62	11·61	6·08
Townsville	11·33	72	28·95	4·11	Maryborough	6·65	72	13·96	4·77
					Nambour	9·57	47	25·39	5·33
Central Coast.					Nanango	3·93	61	5·82	1·39
Ayr	9·62	56	66·17	5·65	Rockhampton	7·74	72	11·05	3·11
Bowen	8·96	72	37·28	9·44	Woodford	8·05	55	17·64	4·42
Charters Towers	4·63	61	14 29	5·53					
Mackay	12·41	72	31·15	10·51	*Darling Downs.*				
Proserpine	13·85	40	43.97	17·74	Dalby	2·85	73	2·79	1·00
St. Lawrence	7·67	72	13·55	3·31	Emu Vale	2·59	47	1·80	8·98
					Jimbour	2·75	64	2·35	1·04
Central Highlands.					Miles	2·72	58	3·06	2·43
Clermont	4·27	47	5·17	1·08	Stanthorpe	3·18	70	3·65	3·72
Springsure	3·78	74	6·41	3·37	Toowoomba	4·53	71	9·68	2·74
					Warwick	3·10	78	2·45	·55
South Coast.									
Biggenden	4·18	44	9·46	6·57	*Maranoa.*				
Bundaberg	6·39	60	22·57	4·87	Roma	2·87	69	6·46	.85
Brisbane Bureau	6·27	95	9·77	3·30	St. George	2·39	62	5·49	2·87

CLIMATOLOGICAL DATA FOR FEBRUARY.

(Compiled from Telegraphic Reports.)

Divisions and Stations.	Atmospheric Pressure Mean at 9 a.m.	Shade Temperature.		Extremes of Shade Temperature.				Rainfall.	
		Mean Max.	Mean Min.	Max.	Date.	Min.	Date.	Total.	Wet Days.
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Pts.	
Cairns	..	88	73	93	28	69	9	964	19
Herberton	..	81	64	89	6	58	6	409	17
Townsville	..	87	74	92	27	70	9, 10	411	17
Rockhampton	29·91	90	70	107	8	66	24	311	13
Brisbane	29·98	83	69	91	27	65	26	330	13
Darling Downs.									
Dalby	..	90	65	100	27	58	7, 16	100	5
Stanthorpe	..	81	60	93	27	49	16	372	9
Toowoomba	..	81	62	94	27	56	26	274	11
Mid-Interior.									
Georgetown	29·83	94	73	98	6, 13	66	9	352	9
Longreach	29·86	101	..	110	6	..	..	100	4
Mitchell	29·89	95	70	102	1, 5, 24	60	8	190	4
Western.									
Burketown	..	..	..	..	..	..	..	394	6
Boulia	29·76	105	79	110	5	68	9	21	1
Thargomindah	29·81	97	73	109	2	67	7	607	7

A. S. RICHARDS,
Deputy Director, Meteorological Services.

Commonwealth of Australia,
Meteorological Bureau, Brisbane.